Telephony.
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Illinois State Association Formed

THE third quarterly convention of the Central Illinois Independent Telephone Association was held in the Coliseum building at Aurora, on Monday and Tuesday, August 7 and 8, there being a large attendance of delegates from all parts of the state. One of the principal objects of the meeting was the formation of a state organization to affiliate with the National-Interstate Association. On account of the late arrival of the delegates there was no morning session held Monday, as called for by the programme, the first session being called to order at 2:10 p. m. by President G. H. Glass, who introduced T. N. Gorman, representing the mayor.

MONDAY MORNING SESSION.

Mr. Gorman in addressing the convention stated that it had been impossible for the mayor to appear in person, but that in his absence he would do the best he could to welcome the delegates to the city. Mr. Gorman stated that the city of Peoria was very glad to have been favored with the presence of such a large body of Independent telephone men, and that he was pleased to say that Peoria was not a stranger to the movement, as they had in course of construction a very fine Independent exchange that was being installed by the Interstate Telephone Company, and that he had the pleasure of casting a vote for the ordinance under which this company was working.

The Hon. C. B. Cheadle responded to the address of welcome in a very hearty manner, his address doing credit both to himself and the association.

The secretary then read the minutes of the last meeting held in Peoria, May 2, 1905.

Secretary Schular read his quarterly report, stating that he had received a total of $38 from fourteen companies that had joined the association.

D. R. Craig of Aurora read a very interesting paper on "City Exchange and Underground Construction."

The following committees were appointed by the chair:

Auditing—E. W. Murray, C. H. Hawkins, R. Criffield.
Credentials—F. M. Ash, R. McCabe, E. W. Bullock.
Organization—C. B. Cheadle, C. Buffan, A. G. Hawley.

It was announced that it would be impossible for E. S. Sterrett of Henry to be present at the meeting, and in his absence Vice-President Camp was requested to read Mr. Sterrett's paper on "Rural Exchange and Line Construction." This paper brought out some very good points and called for some discussion.

A motion was made and carried to adjourn until 8 p. m.

MONDAY EVENING SESSION.

The evening session was called to order at 8:30 p. m. The Hon. C. B. Cheadle addressed the convention, introducing James B. Hoge of Cleveland, Ohio, president of the National-Interstate Association. Mr. Hoge addressed the convention on the subject of "State Organization." His address not only impressed the delegates with the necessity of perfect organization, but called forth the desired discussion, which resulted in the appointing by the chair of a committee on organization, as follows:

Committee on Organization—C. B. Cheadle, Peoria; A. G. Hawley, Dixon; A. S. Hankins, Decatur; O. F. Berry, Carthage; J. W. Barrett, Pekin; C. O. White, Princeton; W. H. Bassett, St. Louis; J. Corcoran, Rockford; E. G. Boynton, Pleasant View.

After considerable discussion as to plans the meeting was adjourned at 9:25 to convene at 10 a. m., Tuesday morning.

TUESDAY MORNING SESSION.

The second day's session was called to order at 10:30 a. m. The reading of the contents of the question box called forth considerable discussion. Following are a few of the questions and the answers:

What is the best way to handle competition between farmers' mutual lines and exchange companies?

This question brought out considerable discussion. Mr. Hoge advised that the mutual companies be incorporated, thus making them more responsible. An attempt should be made to confine them to a given territory, and induce them to use better instruments and build better lines. Mr. Woods of Galesburg suggested that no connection be made with other than metallic lines, and no more than ten subscribers be allowed on a line. Mr. Lee of Champlain suggested that as a matter of compensation he charged farmers' mutuals $5 per year as a flat rate, or a charge of ten cents a message, and rebated fifty per cent to the mutual company.

What is the best way to keep employes interested in their work?

Furnish good quarters for your operators; let them feel that you are interested in them and pay as good wages as possible. For the men, educate them to look forward to future advancement and pay them as well as possible.

The committee on state organization made the following report:

(1) Recommended that the state be divided into eleven districts, each district to be provided with a vice-president.

(2) Recommended that the association be called the Illinois Independent Telephone Association.

(3) Recommended the election of officers to include a president, vice-president, secretary, treasurer, and eleven vice-presidents.

(4) Recommended that the by-laws of the Indiana state association be adopted.

The report was accepted and the following officers elected:

President, E. R. Conklin, Aurora; vice-president, M. Savage, Champaign; secretary, C. B. Cheadle, Peoria; treasurer, C. S. Hankins, Decatur.

The meeting was adjourned at 12:30 to convene at 2 p. m.

TUESDAY AFTERNOON SESSION.

The afternoon session was called to order at 2 p. m.

Vice-presidents were elected in the eleven districts as follows:

District No. 1—A. J. Venier, Kankakee, vice-president. Counties—Kankakee, Grundy, McHenry, Dupage, Cook, Will, Kendall, DeKalb.

District No. 2—Frank Zinnell, Savanna, vice-president. Counties—Jo Daviess, Carroll, Stephenson, Winnebago, Ogle, Lee, Whiteside.

District No. 3—Frank Ashe, Rockford, vice-president. Counties—Rock Island, Henry, Bureau, Starke, Marshall, Putnam, LaSalle.

District No. 4—B. F. Wasson, Clinton, vice-president. Counties—Livingston, DeWitt, Ford, McLain, Vermillion, Piatt, Champlain, Iroquois.

District No. 5—G. H. Glass, Pekin, vice-president. Counties—Peoria, Woodford, Fulton, Masson, Tazewell.

District No. 6—W. J. McQuistin, Monmouth, vice-president. Counties—Mercer, Henderson, Warren, Hancock, Knox, Adams, Brown, Schuyler, McDonough.

District No. 7—W. H. Ramsey, Auburn, vice-president. Counties—Logan, Morgan, Cass, Shelby, Macon, Christian, Sangamon, Menard, Scott.

District No. 8—H. H. Knipe, Decatur, vice-president. Counties—Douglass, Edgar, Clark, Crawford, Lawrence, Richland, Clay, Cumberland, Wayne, Effingham.

District No. 9—William H. Bassett, St. Louis, vice-president. Counties—Calhoun, Jersey, Green, Macoupin, Madison, Bond, Montgomery, Clinton, Washington, Fayette.

District No. 10—C. E. Hull, Salem, vice-president. Counties—Marion, Jefferson, Franklin, Hamilton, White, Gallatin, Salem.

District No. 11—No vice-president elected. Counties—Randolph, Perry, Union, Jackson, Williamson, Johnson, Pope, Massac, Pulaski, Alexander.

Mr. Cheadle made a motion that the convention declare a recess in order that Senator O. F. Berry might deliver his paper on "The Value of Independent Telephone Securities as an Investment," which was declared to be one of the ablest papers ever read before a telephone convention, many points being brought out that have never before been embodied in a paper on this subject. Considerable discussion followed, some very valuable information on accounting being given by Mr. McClurkin and Mr. Hoge.

The question box was again brought forth, the following questions calling forth the most discussion:

Is there any advantage in having a condenser in circuit with the receiver on party lines?

It was decided that there is considerable advantage in their use.

When will the Independent companies be able to talk to St. Louis?

E. R. Conklin of Aurora was called on to answer this question, and went into the matter at some length. Mr. Conklin stated that about four months ago a deal was on to dispose of the controlling interest in the Bloomington exchange. The Bloomington company negotiated with Mr. Conklin of the Interstate company, the Kinloch company, and the Central Union company. Mr. Conklin stated that he met some of the officers of the Kinloch company at this time and came to an agreement with them, whereby they were not to build through the Interstate territory, they agreeing to build through the eastern border of the state to Chicago if they desired, following the route of the Vandalia railway. After coming to this agreement it was understood that the connection at Springfield would be made at once; but a short time after he was given to understand that the Kinloch company was not satisfied with this agreement. Mr. Conklin then agreed to sell them pin space on his lines to within thirty miles of Chicago for the sum of $1 per mile over a distance of about 200 miles. These negotiations were broken off and since that time they have not been taken up by either party.

There was considerable discussion on the matter, the sentiment of the convention being that the association should support Conklin and refuse to connect with the Kinloch.

What amount of compensation should a company handling toll line business receive?

The answer was 25 per cent of all business.

A vote of thanks was extended to the newspapers, the city of Peoria, the Board of Trade and the manufacturers.

A motion was made that Article 7 of the by-laws be changed so as to make the territory of the Central Illinois Association conform with the counties in District No. 5.

On account of the secretary and vice-president being out of the new territory of the Central Illinois Association, Mr. Criffield of Mineer was elected vice-president and F. W. Plattenberg of Canton, secretary.

The Central Illinois Association was adjourned at 5:15 to give way to the new state association.

The new state association was called to order at once by President Conklin, who announced the following executive board: C. H. Hawkins, Senator O. F. Berry, O. G. White, J. W. Barrett, Mr. Savage.

After a short talk by Mr. Hoge on the matter of standard toll signs, the meeting was adjourned.

LIST OF ATTENDANTS.

The following operating companies were represented:

	No. Tels.	Toll.
Citizens' Telephone Company, Pekin, G. H. Glass, manager	1,135	42
Henry Telephone Company, Henry, C. A. Camp	500	25
Streator Independent Telephone Company, A. Schular	1,550	93
Interstate Independent Company, Aurora, E. R. Conklin	14,000	900
Mineer Mutual Telephone Company, Mineer, R. I. Rialsback	600	110
Stanford Telephone Company, Stanford, J. A. Padgett	325	110
Boynton Telephone Company, Pleasant Plains, J. A. Padgett	60	
Pekin Telephone Company, Delevan, G. K. McKabe	315	35
Christian County Telephone Company, W. D. Adams	200	90
Kewanee Home Telephone Company, Kewanee, F. M. Ashe	1,700	20
National Telephone Company, Clinton, B. F. Wasson	2,000	100
Farmers' Mutual Telephone Company, J. R. Wormley, president	200	20
Farmers' Telephone Company, Hopedale, W. M. Mount	269	40
Eureka Telephone Company, Eureka, W. H. Bullock, president	350	50
Home Telephone Company, Dixon, C. B. Cheadle, A. G. Hawley	900	10
Tri-City Telephone Company, Clinton, A. G. Hawley	1,400	60
Girard Telephone Company, Girard	415	28
Auburn Telephone Company, W. H. Ramsey, manager		
Home Telephone Company, Urbana and Champlain, L. Lee, manager	1,500	110
Northern Illinois Telephone Company, Sandwich, E. H. Hennis	2,600	350
Home Telephone Company, Rockford, J. Corcoran, assistant manager	2,400	50
Pekin Telephone Company, Pekin, J. H. Sullivan		
Interstate Telephone Company, Peoria, D. M. Scott, E. W. L. Rice		
Sibley Telephone Company, Sibley, W. R. Hamilton	200	75

Others present included J. B. Hoge, Cleveland; J. H. McClurkin, General Electric Securities Company, St. Louis; W. H. Bassett, Traffic Manager Kinloch Long-Distance Telephone Company, St. Louis; A. L. Tétu, Secretary National-Interstate Telephone Association, Nashville, Tennessee; Senator O. F. Berry, Carthage, Illinois; E. W. Murray, Aurora, Illinois.

Combined Telephony and Telegraphy. II

SAMUEL G. McMEEN

MR. A. R. FLICKINGER of Kenton, Ohio, asks with due and proper reason how one may make the telegraph portion of the circuit described on page 44 of the July issue of TELEPHONY, as shown in Fig. 7, operate satisfactorily with batteries connected as shown in the figure. There are two things to be said with reference to this particular criticism, one being that by an odd accident Figs. 2 and 7 of the story in question were interchanged in TELEPHONY. A close reading of the text in connection with the pictures will disclose the transposition. The other is that the point Mr. Flickinger makes is well taken, as, if the batteries were of an equal number of cells, and were poled as shown in the drawing, telegraphy would be impossible. We shall be obliged if all those who have occasion to refer to the article will consider the battery at one or the other station in that figure to be reversed, in which case it is believed all the requirements of telegraphic communication will be satisfied. For

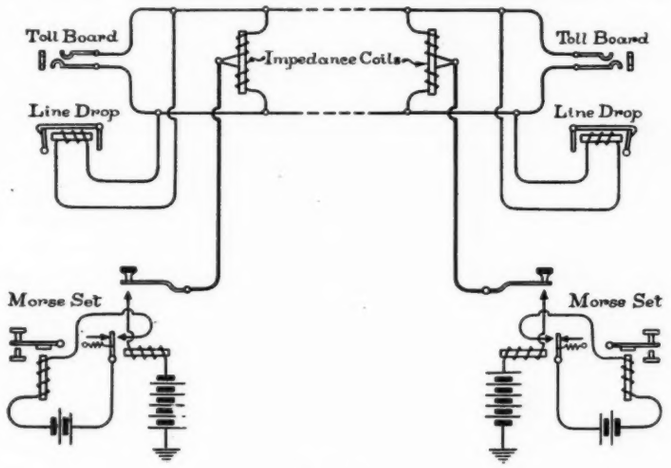


FIG. 1.

the sake of complete correctness, the particular circuit in question is reproduced herewith as Fig. 1, with the correction made.

With almost no variation since the beginning of telegraphic experience, it has been customary to connect the keys and relay windings at the various stations of a line in series with each other, the line wire, and the battery at one or the other end of the line or at both. Very naturally, in the early days of multi-station telephone lines, the same method of connecting lines and ringers was adopted as the standard practice.

With the advent of metallic circuits, however, it was found essential that the two sides of the telephone line should be kept of exactly equal resistance, capacity, and insulation in order that the desired object of perfect quietness from outside disturbances might be attained. In consequence, this meant the division of the circuit of the ringer, which in a large way corresponds to the relay in a telegraph circuit, and the insertion of each of the halves of this ringer in series with a wire of the line. A little thought will show how cumbersome and complicated would become the drops in a way station under these circumstances.

These reasons, coupled with the much more important one that the existence of the high impedance ringer windings in the telephone line interfered with the prime object of transmitting speech, finally culminated in the adoption of the simple expedient of bridging high impedance ringers across the metallic circuit, even leaving them so bridged during the time of conversation.

Similarly, arc lamps were originally connected to their circuits wholly in series, and late tendencies have caused them to be connected more nearly like bridging telephones

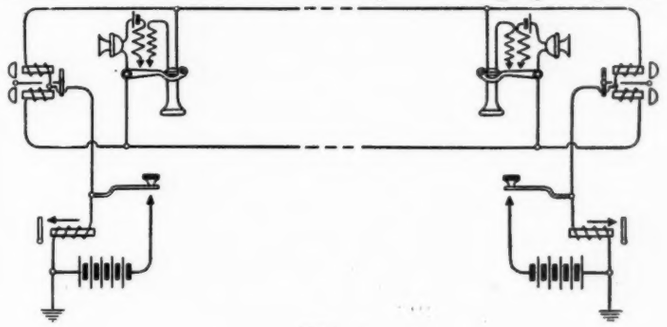


FIG. 2.

or incandescent lamps, which latter have been bridged across the sides of the circuit, like the rounds of a ladder, almost from the beginning of the industry.

During the Spanish-American war, temporary telegraph circuits were established by the signal corps, the whole structure being of an extremely portable character, and established under a wide variety of conditions and circumstances. The poles were of bamboo or whatever might be handy, and the system was a bridging one throughout. A high resistance relay was inserted in parallel with the key and battery in a leg from the line to the ground, and in this way each station, while sending, furnished its own current without regard to what currents might be furnished by any other station. In a word, the analogy was quite close between such a line and a telephone circuit equipped

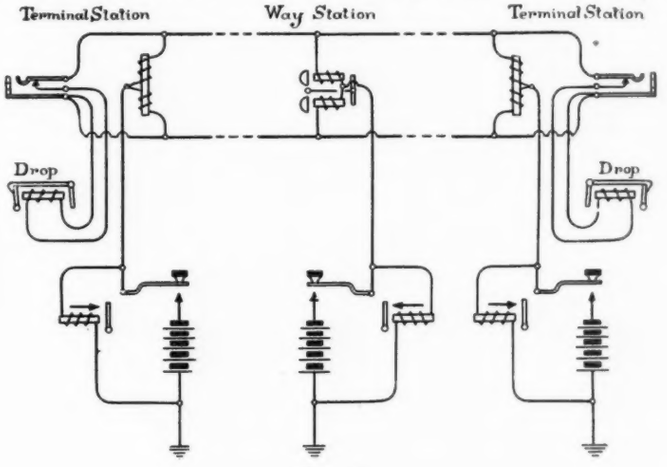


FIG. 3.

with bridging bells. In the latter, ringers are permanently connected from the line to the ground, if the line be one of single wire, while generators are only so bridged at the time of sending signals. So, too, in these bridging telegraph lines, the keys stand normally open, having no circuit closing switches, and only deliver current during such a time as the key be depressed for dots or dashes.

There are other reasons why such a system is of value,

during times of peace, and they will readily be appreciated as lying in the direction of economy of energy, absence of potential upon the line wires except during times of use, and simplicity of connection in emergencies.

An advantage lies in the fact that a line already equipped with bridging bells offers a very ready means of establishing an emergency telegraph circuit, or of establishing one for relatively permanent use, when other than telegraph instruments are not at hand.

Fig. 2 illustrates the connection of two telegraph equipments to a line having a bridging bell at each end. The circuit closer should be removed from each of the telegraph keys, in order that it may never be used by accident. The resistance of the telegraph relays must be high, preferably about the same as the resistance of the bridging bell ringers. The potential of the battery at each station should be enough to give good signals at the distant station, and this battery may be made up of dry cells.

It will be noticed that as in the case of a hand generator, ringing many bridged ringers, the dry battery at the sending station will operate its own relay as well as that at the distant station; while it is not so important that one shall be able to read what he himself is sending, it is important that the relay at the sending station should respond to such transmission in order that the distant operator may break when he must.

This means that the range of adjustment for which each relay must be capable, is such that its armature will leave its front contact between dots during rapid sending from its own station, and also be capable of closing the front contact on receiving signals from the distant station. This condition is not difficult to attain.

It will be noted that the tap from the telephone line is taken at the point of junction between the windings of the two spools of the bridging ringer. In almost all forms of such bells this tap may be reached, sometimes without even dismounting the ringer. The connection should be soldered and carefully insulated.

Under some circumstances it may be desired to establish a composite circuit of this kind between two principal points, and later to establish temporary or emergency stations at way points. If the end stations are equipped with bridging telegraph sets, a tap may be taken from any toll station bell, as shown in Fig. 3.

As has been said in the preceding article, systems of telegraph transmission may be carried on over telephone lines without other limitation than that the methods shall not interfere with each other, and this allows duplex and diplex systems, sending two messages by telegraph simultaneously in the same or in opposite directions, and even quadruplex systems, by which four messages in the same or opposite directions may pass over the same circuit. The only restriction to the use of the very rapid systems in which the sending is done by machinery instead of by hand, is that under these conditions telephone circuits may be interfered with unless the resistance, capacity and insulation of the two sides of the line are much more nearly identical than is required for the maintenance of a quiet condition for telephone work alone.

There is a tendency toward the elimination of the long practiced method of sending Morse signals by hand with a simple telegraph key, a notable example being the introduction of a transmitting typewriter. This is a device which has come into considerable use within the last few years, being a combination of the typewriter and the telegraph key mechanism. The operator may see the typewritten message appearing before him on the typewriter portion of the machine as he depresses the keys, and with each key pressure the proper Morse signal for letter or figure is sent on the line. The rate of sending is under his control and the results are smooth and satisfactory at the receiving end. For the reason that the sending involves no pecularities of electrical transmission, such combined typewriting and transmitting devices are applicable to composite circuits.

There is a renewed tendency toward the production of satisfactory printing telegraphs and it seems quite likely that a system will be developed which will permit messages to be received in such form as to be suitable for immediate delivery without the intervention of the typewriter or pen. There is no doubt that there is a fundamental need for such mechanism. One such system, lately presented to the public, accomplishes its results by means of permutation of relays actuated by currents no more rapid or powerful than those used in ordinary Morse work, these relays being of such relations of permutation as to enable any one of the necessary characters to be picked out at the receiving station, and be printed on the paper with fewer average impulses than are necessary in hand sending of Morse. There is no reason why a composite circuit may not have such printing telegraph apparatus attached to it.

A convenient basis upon which to reckon the charge for a telegraph circuit is the distance between the connected points, and it is not unusual to lease such a circuit for from $25 to $30 per mile per annum, for exclusive and continuous service. A careful inquiry into the real needs of the prospective customer sometimes may show that he requires service fewer than 24 hours per day, and by this means bargains may be made which are of advantage to both parties. In certain phases of newspaper work, for example, matter may be transferred during afternoon or early morning hours before the paper goes to press, and telegraph service may be leased for those purposes only. Proper equipment under control of the wire chief, or its equivalent, will enable the circuits to be delivered to the buyers of the service at the proper time, and in the proper condition.

ACTIVITY AMONG NEW YORK INDEPENDENTS.

The market activity in the stock of the Consolidated Telephone Company of Buffalo, New York, lately, is an indication that there is lively interest in Independent telephone circles. The stock of this company has advanced ten points within a very short time, and it is said that thousands of shares have been bought and sold. The reason for this activity is found in the fact, as learned from reliable sources, that the Consolidated Telephone Company, which controls the Frontier Telephone Company and the Inter-Ocean Long-Distance Company, is to be the nucleus of a gigantic Independent telephone corporation, which is to control all the Independent telephones in the state. The Inter-Ocean Company now covers two-thirds of the state with its toll lines, and has over 75,000 telephones connected with these lines. It connects with nearly all Independent exchanges in the state, and the advantage of a general consolidation of all these companies is so manifest that the movement is meeting with no opposition.

Reports show that there are over 150,000 Independent telephones in New York state, with nearly 500 separate companies. The Consolidated now owns many of these exchanges, and is now planning to secure the others. Recently the large telephone interests in Rochester were optioned at nearly double their cost for apparently this same purpose, and many of the smaller plants are rapidly going into the hands of the larger companies. It is intimated that the Gould interests, which control the Western Union Telegraph Company, are inclined to give the Independents an entrance into New York, on account of the great lawsuit pending between the Western Union and the Bell. If some such arrangement is not made, an Independent system probably will be established there.

Whatever is done in this direction, it looks as though the Consolidated company would be the chief factor in bringing all the Independent interests of the state together, for the reason that it controls practically all the long-distance lines in that state and to points in adjoining states.

Maintenance of Underground Structures

JOHN M. HUMISTON

FROZEN LATERALS.

A PECULIAR form of trouble has been experienced in the compression of telephone cables in lateral pipes, consequent upon the expansion of water in freezing. The wires are crowded together, and the different pairs short-circuited. This trouble was first experienced, so far as I am aware, about 1899, but there were only isolated cases of it. The preventive measure first attempted was closing the top of the iron pipe lateral on the pole. Some of the laterals thus closed gave trouble the following winter because the water already in them had no chance of evaporating. The next was to cement up the mouths of the laterals in the vault. For a great many of these laterals it was not

FIG. 22.

possible to secure drainage all the way to the vault without doubling the cost of construction, so that cementing up the vault ends only prevented water from running from the vault. Some of these laterals also gave trouble the following winter. The remedy next applied was filling the laterals with oil. This seemed to be useless.

The repair of these cables involved thawing frozen ground, digging down, taking up pipes, laying new pipes and installing new cable. This work was carried on continuously, relieving gangs as fast as they were worn out. This did very well when the trouble occurred only once or twice a year. In the winter of 1903 and 1904, however, there were a great many such cases, and R. S. Pierce suggested the use of electric current for thawing these cables out and removing them without resort to digging. Four 300-light transformers were obtained and mounted on a wagon with a switchboard and choke coils for regulation, as shown in Fig. 22. This wagon was taken to the different points of trouble. The electric light company would be notified and would have a man report at that particular point and furnish connection to the primary of their lighting system. The current would be drawn from the secondaries of the transformers in a quantity proportioned to the diameter of the cable and its length. The switches by which the circuits of the transformers were manipulated were arranged so that it was impossible to make a false move. For a small cable the primaries of the four transformers were connected in series, the secondary being in multiple at all times. This arrangement gave twenty-eight volts, and the amount of current could be adjusted with a choke coil. A cable one inch in diameter with a lead armor 3-32 of an inch thick and 100 feet in length would be thawed in about two hours with 250 amperes at 28 volts; a cable two inches in diameter, with ⅛-inch lead armor, and 500 feet long, would be thawed in about five hours, with 600 amperes at 110 volts.

These two instances represent approximately the extremes

FIG. 23.

that were encountered. There was one extraordinary case, however, where we were obliged to apply current directly to the iron pipe for a distance of about thirty feet. In this case twenty-eight volts were used and forty ampere fuse was opened in the primary. The pipe passed under a street railway track and the secondary connections were maintained over the trolley wires by means of extension ladders. These secondary connections consisted of one No. 00 wire and two No. 4 wires in multiple. During the twenty minutes that this current was applied (and it was shut off occasionally to allow these wires to cool off), the insulation on the leads from the secondaries was burned up, except where the wires were laid on the snow.

The great benefit of thawing the ice as the cable lies in the lateral, is in the possibility of recovery: the wires are crossed by being crowded against each other through the paper, which is a somewhat elastic medium. It is possible for the cable to be crushed so hard that it will always remain so, but in many cases, if the defect is known before the cable is compressed to its minimum bulk, there will be sufficient recovery to clear the defective conductors.

A majority of the cases which occurred, involved cable

Third installment of a paper read before the American Institute of Electrical Engineers, at Chicago.

with single wrapping of insulation. It seems probable that while the double wrapping does not insure the cables from such action, it aids materially.

To guard against subsequent difficulty of this nature, it was decided in new construction to install laterals entirely of tile, as it was found that where a cable was frozen in such a pipe, it was not crushed. Experiments were made by placing a cable in an iron pipe bent with the open ends up, and it was found that the upper surface of the water became frozen first. As the pressure increased in the water below, the cable was crushed, and at the point where it was crushed the worst, the water was not frozen at all.

FIG. 24.

It was supposed that in concrete joints of the tile, the water under pressure would percolate out sufficiently to reduce the pressure and save the cable. This theory was first suggested by W. R. Abbott several years ago. He proposed that a hole be cut in the iron pipe at the bottom, allowing the water to drain off.

Besides changing the form of construction, precautions were taken to close the lateral at the upper end on the pole, and to make a little drip loop in the aerial cable where it entered the lateral. We found one place where the cable rose from the lateral pole to the next pole, and while the wind was blowing a steady stream of water, from the rain striking the cable in this span, was running down and into the lateral pipe.

While the electric thawing apparatus was being developed, experiments were being made along other lines. A frozen cable, not in trouble, but which it was desirable to replace with a larger cable and which was near the office, was selected. The lateral was filled with wood alcohol and this was pumped out every day and replaced with fresh. This in the course of a week worked its way back about twenty feet. This was too slow. We next poured in a hot saturated solution of calcium chloride. This freezes at fifty-eight degrees below zero. By changing this every day for another week, we were able to get thirty feet farther. Both of these methods proved to be useless where it was necessary to remove frozen cable, but they pointed out that it might be possible to prevent freezing by putting this salt into laterals in the summer-time.

The frozen conduits, in that portion of town where the high tension alternating circuits were unavailable, were attacked with the steam from a portable boiler. At first either a fire engine or a steam beer-pump cleaning boiler, furnished the steam. The first cost five dollars per hour, the latter cost one dollar per hour. Later in the season a second-hand automobile boiler was purchased. This is shown in action in Fig. 23. In the background the wagon equipped with transformers can be seen, to the right of the wagon a man is pumping water from the vault in the main conduit. The pole to the right in the foreground is the one on which the lateral terminates. A continuous stream was running from the lateral into the vault from five minutes after the current was applied until after the men had left. The real source of trouble can be seen at the outer end of the ash chute by the cellar window of the apartment building. It was a pipe driven down to hold the side-boards of the walk. It was holding the cable in a way which defied the loosening efforts of both steam and electricity. Fig. 24 is another view of the portable boiler.

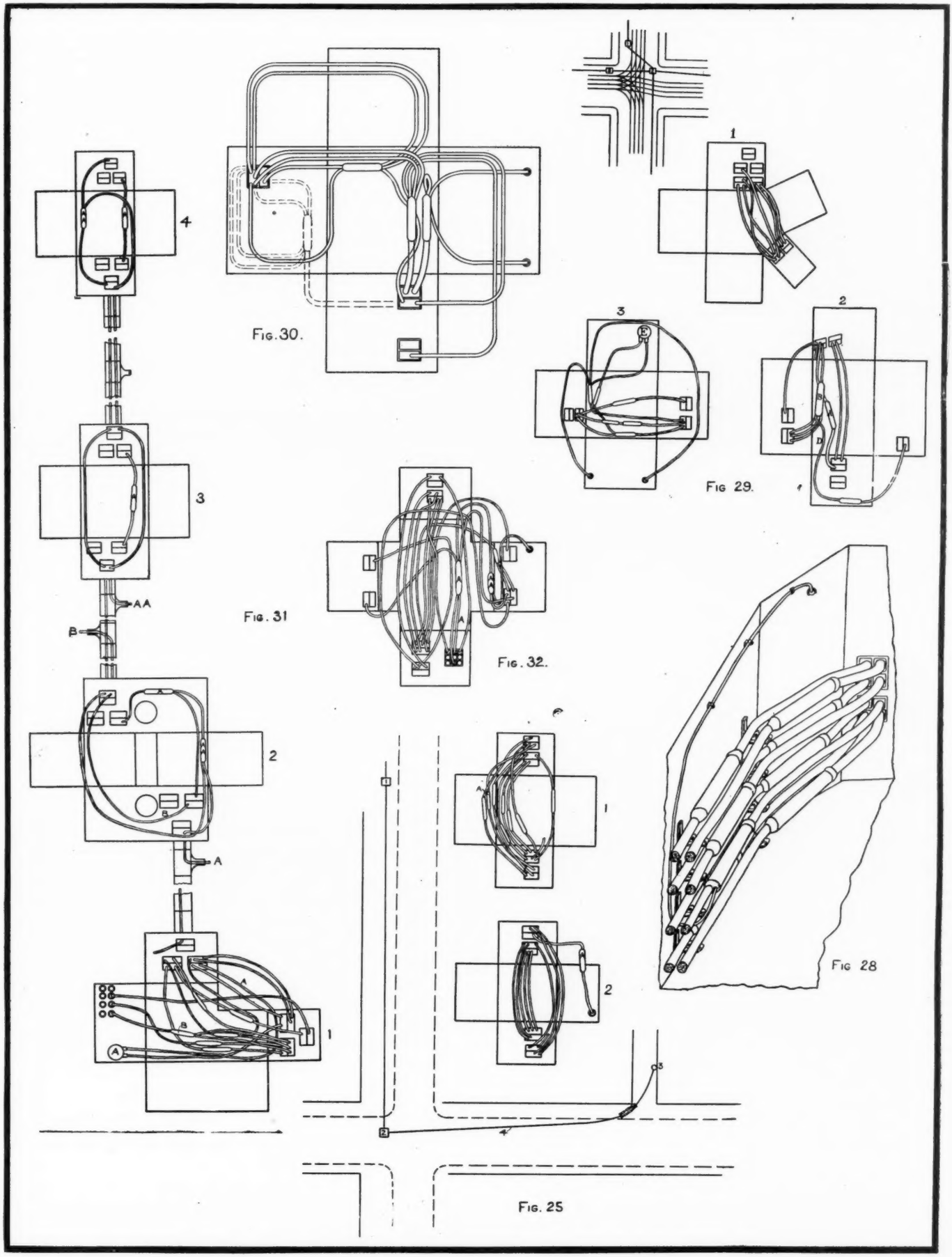
A troublesome case of a cable frozen in conduits was at Clark and Twelfth streets. (See Fig. 25). The conduit between vaults 1 and 2 consists of two runs of tile of the form shown in Fig. 2. The lateral from vault 2, to the right, is of three-inch iron pipe. It was necessary to replace the cable in this iron pipe lateral with a larger one. Vault 2 was at the lowest point in the street. We found it full of ice. A hole was chopped through this ice, the water in the bottom pumped through this hole and a couple of gasoline furnaces placed on the bottom. It took several hours to melt the ice, maintaining a circulation all the time to furnish air for combustion. A pull on the cable moved it several inches only. This was probably slack, but it led us to believe that there was a buried pocket at the bend in the lateral. An excavation uncovered an old break in the pipe that had been made to allow some repairs. This break had been neatly bricked up. The real trouble was apparent when this was uncovered. The pipe was entirely full of frozen mud. After spending about eight hours trying to thaw this ice both ways from the buried pocket, using the steam from two portable beer-pump cleaner boilers, it was found necessary to make another excavation at the point 4, and thaw either way from this latter point.

It took thirty-six hours to remove this cable. The new cable was then pulled in and spliced up. During the night that the splice was made in vault 2, a heavy, warm rain set in, which melted all the snow and filled all the sewers. A sewer manhole immediately alongside of vault 2 had its outlet stopped up in some way. It filled up and ran over into our vault so quickly that the workmen did not have time to make a good job of wrapping a rubber bandage around the incomplete splice. Water got into the cable

FIG. 26.

between the vaults 1 and 2 and penetrated so far from vault 2 that it could not be dried out at that point. Of course vault 2 was immediately pumped out, and the sewer alongside cleaned out so that the water ran off, but the dampness had already done its work. We then attempted to pull the cable toward vault 2, as we had sufficient slack in vault 1. This was found to be impossible, as the conduit for 150 feet north was entirely full of frozen mud. The photograph, Fig. 26, shows the mud as it appeared in the conduits when this defect was remedied later in the season.

In order to keep the lines working, the only feasible


4
3
AA
B
2
A
1
A
B
A
Fig. 30.
Fig. 31
Fig. 32.
1
2
3
Fig 29.
Fig 28
Fig. 25

scheme was to extend an aerial cable from vault 1, along the viaduct and down into vault 2, splicing onto the new cable going east. This was done as quickly as possible, the cable in vault 1 being spliced onto the same cable, which is marked A in both diagrams. By looking at the upper vault diagram of Fig. 25 it will be seen that cable A is in the same position in the conduit, going both directions, but that it was spliced up so that it linked around the other cables. This, of course, was objectionable, as it made it difficult to handle any of the cables. Later, when we succeeded, by digging up and thawing, in pulling the cable AA about three feet farther into vault 2, clearing our trouble and cutting out the temporary work, we made a new splice in cable A on the opposite side of the vault so that this interlinking did not occur. This case brought up the necessity of having some appliances on hand for drying out a cable without removing it or opening the core.

DRYING CABLE CORES.

Several months subsequent to the above occasion a section of cable about 460 feet long was punctured, and the dampness penetrated about one foot inside the duct. The projected erection of a new office in the district which this conduit line served would release the cable in the near future. The compressing and drying apparatus (Fig. 27) consisted of a bicycle foot pump, the tank of a fire extinguisher, a hose connection to a piece of two-inch iron pipe fourteen inches long, and a hose connection from this to a length of three-sixteenths inch brass tubing, one end of which was tapered down to a point and perforated. A cylinder of wire netting filled with calcium chloride, because of the affinity of the latter for moisture, was placed in the tank. The tubing was thrust back in the core of the cable about four feet and the pump started. Several gasoline torches were turned on the two-inch iron pipe and several on the tank. The insulation values were not measured absolutely, but tests made with a head telephone showed a slowly rising insulation. In about two hours service was restored on most of the pairs, and in another hour on all but one.

ARRANGEMENT OF CABLES.

In connection with Fig. 3 and Fig. 25, I alluded to the arrangement of cables in vaults. This is a very important matter. As such work is invisible, it is a difficult and expensive matter for the underground foreman to inspect it all. The workman knows just how much of a chance there is of his work being seen while his connection with it is fresh in the mind of the foreman. If certain definite rules of arrangement can be specified, and if they are such that general adherence to them is not out of the question, the amount of inspection which is always possible, coupled with the fact that the average workman prefers to do a nice appearing job, will result in good construction.

Fig. 28 shows an ideal arrangement of the cables on one side of a vault. Note the disposition of the lateral cable with respect to the main cable to which it is bridged. It is so arranged that it will not interfere with putting any main cable out where the splicer can blow his wiped joints and remove the sleeve. I have frequently seen situations where it was impossible to do work on one cable without pulling slack on one or more others, and of course the slack has to be again pulled back. Such a diagram should be a part of every specification for cable work, as the familiar perspective drawings are a part of every specification for aerial construction.

I wish to illustrate some of the kinds of work to be avoided by a few drawings of imaginary arrangements. Fig. 29 shows three vaults. The street intersection in the corner shows the position of the vaults in the street. In vault 1, it will be noticed that one of the cables might be transposed with another one; in vault 2, it will be observed that the case might be worse. It would be almost impossible to work on splice A with splice B obstructing the workmen in their operations. Cable D is taken into the branch splice in the wrong position. In vault 3, it will be noticed that the three cables coming from splice B have five splices in them, and also loop in the distributing box. It is apparent that all of this work could have been arranged in a very much simpler way and in a way which would have given much less chance for trouble.

Fig. 30 illustrates another condition. By looking at it carefully, it will be seen that a main cable extends from the office to this vault and breaks up into four smaller cables which distribute to different buildings. The cable interlinks with the other cable in the vault so as to make it difficult to handle any of it. The dotted lines show the manner in which cable A and splice A should be arranged.

Fig. 31 shows several vaults in a line of conduit, the lower one of which is at a junction point. We will suppose that cable A extends from the right into vault 1, loops through the underground distributing box A, and extends up to, and through, vault 4. In vault 2 there is a branch splice A. The cable leading out of this branch has another branch splice, there being two cables leading from this second

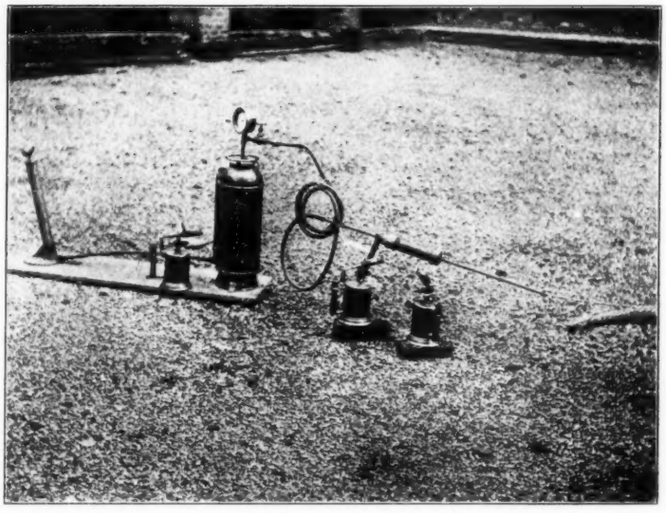


FIG. 27.

branch. One of these two cables extends down and feeds out of one of the outlets to the right; the other cable extends up through vault 3 to vault 4, where it has a third branch splice AA. One cable leading out of this third branch splice extends up, while the other comes back down and extends to the right through an outlet between vaults 3 and 2. Cable B, in vault 1, has a branch splice; one cable leading out of this branch splice extends north in one of the lower sections of tile to vault 2. In vault 2 it changes to the upper line of tile having the outlets, and leads out of outlet B. It will readily be seen that such an arrangement is very difficult to indicate satisfactorily on the records. Of course, the proper arrangement of these cables would be dictated by the facilities in cable conductors at the disposal of the engineer.

Fig. 32 shows a supposed arrangement in a vault, which is a junction point. In such vaults extra precautions should be taken to hang the cables in a workmanlike manner. We will imagine that cable A is a 400-pair cable having four branches in splice A; one of these again has two branches in splice AA. One of the branches from splice A doubles back in the same conduit line with the main cable and there is no slack for handling it in this vault. This might have been caused either by the engineer or the splicer. If by the former, he ordered the cable on an incorrect measurement; if by the latter he thoughtlessly cut off and left as

waste the additional amount desired by the engineer tor slack in this vault.

It has been my desire to convince the members of the Institute by these several examples that slight deviation from proper methods, by starting demoralization, might lead to some very bad results.

I wish to close by condensing the main thought in this paper into a few "dont's":

Don't provide for any construction other than the simplest possible.

Don't neglect plant records of any feature which might influence maintenance, even to the simplest detail.

Don't do temporary work, unless the expenditure necessary to properly arrange it has been already authorized.

Don't think that you can spread your faculty of exercising vigilance over too many things that are in bad shape.

In conclusion, don't fail to remember that, as "Order is Heaven's first law," so is it the underground foreman's first duty.

DISCUSSION.

The discussion of this paper was participated in by Messrs. W. G. Carlton, G. N. Eastman, G. E. Strohm and Peter Junkersfeld, all of the Chicago Edison Company.

Mr. Carlton said: "There is one thing that Mr. Humiston brought out at the last in summing up his paper. I refer to the necessity of paying attention to the details of the work. One thing in regard to the plant, as Mr. Humiston has been describing it: Almost any underground plant of any size has a great deal of old work. New work is being installed from time to time without interfering with the operation. As a rule in a large company, as the department chiefs are shifted, the men in the active direction of the work are changed from year to year, or every few years; so that no one man has been giving details of construction and of harmonizing new work with old, continuous attention. One of the most difficult features of superintendence is to make the new work fit properly with the old. New work itself could be made reasonably good if one has the money, but with a lot of old work that is too good to throw away, it is hard to make rearrangements that are not only first-class in every particular, but that are reasonably good construction.

"About electrolysis: Last fall I had occasion to have an examination made of a 6-inch wrought iron water pipe which was laid in Chicago in 1892. In the northern part of the city, with sandy soil, the pipe was in excellent condition, and the black paint, or whatever was used as a covering, appeared to be almost as good as new. Further downtown, alongside one of the elevated roads, the pipe was uncovered for a considerable distance, and opposite every pier, for possibly a half dozen piers, the pipe was badly corroded. In many places holes were eaten entirely through. In many other places holes could be broken through by snapping it with the finger.

"In regard to protecting the lead sheath of the cables toothed segment held in a trunion bearing on the right hand by breaking the electrical continuity of such sheath, I would like to say that we have made a great many measurements which verify the results given by Mr. Humiston.

"The protection of cables through tunnels by using tile and putting the conduit line in the tunnels was mentioned. I think it is a good thing not only to build a conduit line in a tunnel, but to build it in the shaft also, saving about as much space at the bottom of the shaft as is needed for a manhole, covering the cables at this point after they are installed.

"One thing that was mentioned earlier in the evening, the matter of supporting the cables in the shafts of buildings. I think it could be done very well by using vitrified clay duct. It should be put in solid, practically the same as a vertical conduit line, but the bore should be only a trifle larger than the cable. In that case the friction of the cable inside of the conduit partially supports it, and the weight would not all have to be taken at the top.

"I have been asked by the chair to enlighten my hearers on the provisions of the Chicago ordinances in regard to electrolysis—what they are, how they are observed, and how far it is practicable to observe them. The currents which caused the damage are all street railway currents, and it should seem that sufficient bonding would remedy this matter."

The chair then asked Mr. Humiston to outline the city ordinances. Mr. Humiston said that if there were a street railway man, or a city inspection department man present, he should request him to give that information, but in the absence of such authorities, he would give it as accurately as he had it in his memory:

"The ordinances recommended by Mr. Elliott provided that there should not be in any one block, on one street, a *variation* in difference of potential between the water pipes and the railroad track of more than a half volt. That is, if at one end of the block the water pipe was 3.5 volts positive to the track, at the other end of the block it should not be less than three volts positive, or more than four volts positive."

Mr. Eastman said: "There have been some cases that it has seemed rather difficult to explain about the action of electrolysis, and I should like to inquire if any deterioration in the lead sheaths of cables has been found which could not be traced to electrolysis, and which might possibly have been due to the conduit or to the action of acids, or corrosive elements in the soil."

Mr. Humiston said: "I believe that a great many such cases have arisen. I do not think that any particular analysis of them, so far as I have known, has been proved to be true. In creosoted pump logs we have had little buttons form on the outside of the cables, and a hole has penetrated at that point. The circumstances under which those buttons formed, however, we were never able to reproduce. Different kinds of filling may have some action. Wood and decaying vegetable matter make acetic acid, which is quite violent in its action on the lead sheath of the cable. I think many cases of cable trouble could be charged to this acetic acid rather than to electrolysis. But as to any mechanical changes in the lead, due to crystallization, I know nothing. There have been a great many people that have claimed that with an alloy of tin in the armor, if it was imperfectly mixed, due to expansion and contraction with heat and cold, a form of crystallization would set in and ultimately rupture the cable. The only case that I have ever known to be proved was in the case of an aerial cable. Mr. Grace, the chief engineer of the Central District and Printing Telegraph Company, found that their practice of leaving a slack loop in the cable at every pole, so that they would always have slack to splice in a terminal if it should be necessary subsequently, together with the practice of pulling high-grade steep suspension wire very tight, caused trouble. The difference in the amount of expansion and contraction between the lead armor and steel suspension wire would make a movement there which, in the course of a year or two years, would crystallize the lead right at the bend. He proved that definitely by suspending some cable on the roof of a house and reproducing the variation of temperature between day and night at will, by putting a piece of resistance wire around it. As far as such mechanical change is concerned in underground cable or cable installed in conduits, I know nothing about it. Mr. Carlton spoke of supporting the cables in a vertical conduit. The Chicago Telephone Company has a vertical conduit seventy-five feet high, of three and one-eighth inch tile pipe on the east wall of its building. The cable is passed through steel plates at the top and at the bottom and fastened in with wedges. When this was originally installed about five years ago, the company made some measurements to see if the lead

stretched, keeping this up for about a year and a half. Beyond the first two or three days there was no evidence of the lead stretching."

Mr. Strohm said: "It has seemed to me that many cases of corrosive acid on lead cables have occurred, which cannot be laid to electrolysis. Upon inspection it would seem from appearances to be due to this cause, but the locality and the absence of the characteristics of street railway current have proved that it was not. As has been said, there are some corrosive elements in earth, which will produce apparently the same results as electrolysis, and the cases that I have in mind were in certain parts of the residence district of the south side which are very remote from any electric line, and which tests show could not have received current from underground pipes. We have found many cases where iron pipes have been destroyed by cinders.

"In regard to supporting cables in a shaft or vertical conduit, I wish to say that I have found that where you put the cables in such a conduit, and after taking care properly of the bend at the bottom of the shaft (I am speaking of a tunnel under the river), and then removing the supports, at the top, the cable would settle probably an inch or so, and there it would stop. In other words, the cable simply stands on its own end. There is no need of any support around the lead sheath of the cable. Therefore, there is no chance of breaking the sheath. I am speaking of electric light cables."

Mr. Junkersfeld said: "I would like to say on the subject of electrolysis that the difference of potential in most systems is pretty well below the ordinance requirements, and up to date street railway management finds it commercially advisable to keep pretty well below. The root of the trouble is the difficulty of maintaining any bond and good return circuits. There are many good bonds, but they all require careful looking after. It is very difficult to make a good contact between copper and iron or steel. People have been working on this bond question for ten or twelve years, but the ideal bond has not yet appeared. Among other things that came out in the paper, this one is of considerable importance. In a large city the reason why the differences of potential are usually well below the ordinance is that there is such a vast network of cable that the systems automatically drain each other; but for all that it is well to look carefully after the interrelations of the systems with each other, and maintain the drainage of which Mr. Humiston has spoken."

TELEPHONE TO OPEN FEUD-RIDDEN COUNTY.

If a movement which was started several months ago by some of the more progressive citizens of Breathitt county, Kentucky, materializes, the most useful invention of modern times—the telephone—will be established in the feud-ridden county and the people will be afforded an opportunity of communicating with the outside world after 6 o'clock at night. For years a majority of the citizens of Breathitt county, and more especially the town of Jackson, have made efforts to have the long-distance telephone established, so that it would be an easy matter to talk to persons in adjacent cities and other sections of the state, but each movement along this line has always met with the opposition of a certain class of men of the county, and as a result it is now impossible for any communication to be had with the town of Jackson, except by wire, and that cannot even be done after 6 o'clock.

It is true that Breathitt county has a telephone system, but it only extends to some of the upper counties, which, however, have no direct communication with any of the counties on either side. One of the most prominent citizens of Jackson, himself an official of the county, recently stated that one of the most glaring shames of the county was the lack of interest taken in its business affairs, even by those who are in a position to promote its welfare. He said that numerous requests had been made by various persons to have a first-class telephone system put in operation, and that the matter has now, he believed, assumed such shape that the demands of the people are in a fair way to be granted. He further said that the people of the outside world could little imagine the difficulties under which the inhabitants of Breathitt county labor in trying to be progressive. He stated that on several occasions many things of real interest to the outside world had occurred in Jackson between 6 o'clock and midnight, but that on account of the poor facilities for transmitting messages, the people of the state were kept in ignorance of the fact sometimes for days at a time, and frequently it was never known. As an instance of this, he recited the assassination of Dr. D. B. Cox, who was shot about 8 o'clock at night, which fact did not become known until the next morning after the Lexington and Eastern train had arrived in Lexington, when passengers from Jackson were brave enough to communicate the facts after they felt secure from detection in telling the news.

In conclusion the official said the present state of affairs had existed for so long and the people had been so oppressed that they feared to speak out, but so many things had come to light in the past few months that a majority of the best people of the county are talking and acting with more ease and it is now possible to get a great many of them to speak their minds. He ventured the assertion that if a poll of the town of Jackson were taken it would show that he had voiced the sentiments of over two-thirds of the entire male and female population.

NEW RECORDING TELEPHONE.

John Albert Chrystie, in the Board Exchange building, has a recording telephone attachment that is giving Thomas A. Edison a great many unhappy moments, says the New York Times. The phonograph, unfortunately, though a very wonderful instrument, never reproduces, so far as anyone can detect, the human voice. It gives back a sound, with words, but the voice is always the same. A song by Jean de Reszke sounds no better, except as to phrasing, method, etc., than one by Patsy Snider. It is simply filled with harsh, metallic substance. Mr. Chrystie's machine, invented by a Dane, reproduces the living voice so realistically that there can be no mistaking its identity.

The other day John E. W. Sanderson picked up the bugle-shaped receiver and sang his famous version of "I Dreamt I Dwelt in Marble Halls," in that off-hand style for which he is noted at Masonic Club smokers, not forgetting to add a few bars about "Old Noah." All that can be seen of the mechanism consists of two spools of silver wire, reciprocal. The wire is two miles in length. It picks up the voice and hands it back to you through a transmitter immediately, just as you delivered it. The record is indestructible if you wish it to be. No man knoweth the sound of his own voice we have been taught to believe. The statement should now be revised. Dr. Sanderson heard himself sing and was startled.

This Danish miracle will legalize all transactions by telephone. By means of a wire it is connected with the ordinary telephone instrument, you ring up "Central," as usual, get your vis-a-vis, and go at him. Every word uttered by both speakers is recorded and can be carried to court. If one of our gay brokers of the Smart Set telephones to his inamorata his darling wifey may slip into the office, turn a lever and have the entire conversation repeated, recognizing the voices. If you telephone an order to your broker to buy 1,000 shares of steel preferred at 100 and he pretends you said 102, you can "nail" him by the record.

DIGEST OF TELEPHONE LITERATURE

Conducted by Samuel G. McMeen.

Columbus, Ohio, Situation—Western Telephone Journal, August.

FINANCE AND ECONOMICS.

In a condition which required extensions to their system, the operating company in Columbus abandoned the manual and installed the automatic system. Six thousand stations are now going into service on that plan.

British Telephone Agreement.

A committee appointed to consider the best form of agreement as to the future joint operations of the governmental and privately owned systems in England, has reported, recommending that the properties of the National Telephone Company be purchased outright by the government, and both systems hereafter operated as one.

Telephone Growth in Southern California—HIGGINS.—*Electricity, July 26.*

Three years ago there was but one Independent telephone exchange in all southern California, and to-day there are nineteen, connected by an extensive and satisfactory system of long-distance lines. The number of subscribers served by the Los Angeles exchange is 16,000, and the total in the group of nineteen exchanges is 24,000. A large number of the subscribers in this group are served by automatic apparatus.

Telephone Service and Rates in New York City—Electrical Review, August 5.

There is an organization in New York known as the Merchants' Association. Last year it took up the task of inquiring into the telephone problem, hoping to secure a reduction in the rate charged by the Bell company operating there. The report which has been rendered by the association indicates that the investigation has been thorough, and that as a result of the labors of the committee certain reductions have been granted already. The report of the committee is an exact and lucid one, and some of the conclusions given are of interest with reference to other communities than the one which has been studied. Among them is one to the effect that a flat rate system of charging for service is harmful to the public and that the practice of measuring service as applied by the New York company has no fundamental flaw in it.

The Farmer Line Problem—STENINGER.—*Telephone Magazine, August.*

It is the belief of this author that the ownership of the farmer line should rest in the exchange and that the territory of each exchange should cover not only the town in which it lies, but the surrounding country, to contact with a similar area of each adjoining exchange. It is his further opinion that rates for rural service should be based on those for urban residence service, and that the fees should be paid annually in advance. Free service between rural subscribers and city subscribers should be restricted, a given rural subscriber, for example, receiving free connections only with his own exchange, and that immediately adjacent.

Telephone Soliciting—DAVID.—*Sound Waves, July.*

It is apparent that Independent telephone companies are appreciating more and more highly the advantage of presenting their problem clearly to the public. It is the opinion of the writer that much harm may result by representing the telephone industry through incompetent personality. Advertising is an important adjunct of the contract department, and the conduct of such a campaign should be controlled by the contract agent. Consistent and persistent advertising by the use of a reasonably small space will produce better results than the consumption of a larger space with a less carefully designed routine. An interesting and important suggestion is that of notifying non-subscribers that they may secure directories from the telephone company. With such an arrangement, the contract department is enabled to learn the identity of non-subscribers who have an interest in the service. The classified list is an essential part of the directory. An instance is given of an exchange having 500 subscribers, in which it was believed saturation had been reached. A re-canvass trebled the total number of stations. The writer recommends that the canvass cover the residence area first.

Municipal Telephones a Failure—Finance, August 19.

James Dalrymple, a Scotch expert in municipal ownership, recently visited the United States to make certain inquiry into traction conditions in Chicago. He is familiar with the municipal telephone plant in Glasgow, and after having examined our largest and best example of telephony, he denominated the Glasgow equipment as being relatively a toy. One of the reasons for dissatisfaction in Glasgow is the character of the system installed, which requires, among other things, that each subscriber shall turn the crank of his bell, not merely to call the central office, but to ring the desired subscriber after having been connected. Attempts have been made to improve this condition, and various modifications have been made since the installation was completed, about five years ago. It is now questioned whether the city is really getting the financial results which it claims, there being much doubt that it is getting better than it claims, and very little that it is not doing so well.

Advance in Rural Telephony—Electrical World and Engineer, August 19.

It is said that no other agency has influenced country life in America in the past five or six years to so great an extent as the telephone. There seems to be little doubt that many agriculturists are losing money because of the lack of telephone connection. Much of the isolation of farm life has been removed by the extension of trolley lines, but even with a much greater ramification of this kind of transportation there would still be required the time necessary to make the journey. Considering farming as a manufacturing proposition, it differs from most others in that the year is limited to about two hundred good working days. During this busy season, therefore, the loss of a single day may inflict a large financial damage.

Telephone Rates in Europe—GRADENWITZ.—*American Telephone Journal, August 19.*

Telephone exchanges on the continent have a broader extent of practice relative to communications which are not immediately between the two communicants. For example, messages may be written and filed with the telephone exchange, being transmitted by employes, and at a charge based on the number of words. Similarly, messages may be transmitted part of the way by telephone, and the balance by post, by express or by telegraph, in which case the fees for the two or more services are added together. A charge is made for moving a telephone from one location to another, and, similar to certain practices in America, some payment must be made, unearned by service, in case an equipment is caused to be removed before the expiration of the term of the contract. In certain cases of adjoining exchanges, one may have free service between the two by paying the rate charged in the exchange having the higher one, even though his location is in that having the smaller.

Night service over toll lines is between nine o'clock in the evening and seven in the morning in summer, and eight in the morning in winter, and is at a lower rate than day service. The general practice relative to public pay-stations, whether equipped with coin collectors or in charge of attendants, is in general similar to the practice in this country.

Transfer Systems and Multiple Switchboards—ABBOTT.—*Electrical World and Engineer, July 29.*

EQUIPMENT.

The mathematical and practical description of a type of switchboard in which calls for lines not within the reach of an operator are trunked to other operators in the same office. The section also treats of the series multiple type of switchboard, other types being reserved for discussion in succeeding installments.

Transfer Systems and Multiple Switchboards—ABBOTT.—*Electrical World and Engineer, August 5.*

This second installment of the article illustrates further the arrangement of circuits in a series multiple board that carries the treatment to the early form of branch terminal or bridging board in which the multiple jacks were provided with three springs and two thimbles each. The line drops, battery signals, jack strips and circuits of such an equipment are illustrated as described.

Eight Party Selective Call System—CLAUSEN.—*Telephone Journal, August 12.*

The third article of a series, developing further the complete system of key and power circuits necessary for the operation of the system. Current from the usual alternating generator supplies the needs of ringing four of the stations, while special batteries of ten cells and ninety cells provide the necessary pulsating and continuous direct currents.

German Railway Telephone Apparatus—GRADENWITZ.—*Telephone Journal, August 12.*

Substantial and serviceable apparatus has been brought out by German manufacturers for use on railways in Saxony. The service is utilized for railway signaling and train dispatching, and in several particulars the equipment differs from any with which we are familiar in America. Each station is equipped with two receivers. The usual type of gravity switch is lacking, one of the receivers being mounted on a flexible arm, the rotation of which operates the necessary contact pieces to bring in the talking circuit. Batteries exist at the terminal stations only, and there are condensers in the talking circuit.

Eight Party Selective Call System—CLAUSEN.—*Telephone Journal, August 5.*

The second article of a series. A drawing illustrates the complete connections of each station, and the principal features are that the line is a metallic circuit, that four of the stations are equipped with choke coils, the other four with ringing transformers, each with a polarized relay, a ringer and a generator; that a condenser is used in series with the receiver, and that a ground is necessary at each station. The four stations having choke coils are rung selectively by alternating current over one wire, after the selection has been made by the use of positive or negative direct current on one wire or the other. The four stations having ringing transformers are rung by means of interrupted current of one polarity or another, this being applied to the same limb of the line as the current which determined the position of the polarized relay. The article is continued.

Junction Box for Intercommunicating Systems—MCMANN.—*Telephone Journal, July 29.*

By far the greater number of intercommunicating systems utilize a number of lines running about the premises, with a tap from each such line to each station. This enables a subscriber to select the line of the desired person, and call upon it directly. For convenience in installation, tests, repairs and changes, junction boxes are found very useful indeed. These are to be connected to the main cable, providing means for dropping out the branch to the station. The author describes and illustrates such an arrangement.

Systems for Rural Service—TAYLOR.—*Sound Waves, July.*

By far the most usual method of connecting telephones on a rural line is to use bridging bells, connecting them across the metallic circuit, if such a line is used, or from the line to ground if the circuit consists of a single wire. In some instances the number of stations on a country line is so great that the problem of securing individual bell signals for the various stations is a serious one. In addition there is always the desideratum of decreasing the amount of ringing over the line. Both of these things may be accomplished in some degree by bridging the ringers of part of the stations of a metallic circuit from one wire to ground, and those of the rest of the stations from the other wire to ground, while conversation takes place over the metallic circuit. With proper ringing keys the central office can call any station by ringing its signal on the wire to which it is connected. By going a step further and equipping each station with such ringing keys, any subscriber may single out any other on his line, or call the central office, as he wishes. If the substation keys are arranged with back contacts normally keeping the generator in bridge with the line, the central office will be signaled only when neither of the buttons is depressed. If desired the ringers of such a country line may be provided with bias springs, thus enabling a further subdivision of the stations on each wire. This would give complete selection for eight stations. An important point in connection with biased ringers is that they must have strong permanent magnets. Another is that the resistance and consequent impedance of such ringers should be high, the winding being best when of not less than 2,500 ohms resistance. It is obvious that almost any other form of four-party selective system may be used in a similar way, whether the ringers be of the biased or frequency type.

Private Branch Exchange Construction—PRICE.—*Telephone Journal, July 22.*

In private branch exchanges two classes of local service frequently are given. In one, the broader class, subscribers may communicate with each other and over trunk lines with the public system. In the other and narrower class, subscribers may communicate only with each other within the limit of the local system. There are many methods of restricting the service, as this arrangement requires, and that which is described by this author depends upon the use of jacks and plugs of different sizes. It is of advantage to arrange private branch boards so that the wiring and apparatus are readily accessible, and some means of doing this are described in the article.

Portable Street Railway Telephones—*Electricity, July 19.*

The street railway company of Westchester, Pennsylvania, operates many lines into the country and the car conductors carry portable telephones in their pockets. These may be connected with the telephone line along the route at frequent intervals.

Protection at High Tension Crossings—BUNDERMAN.—*Telephone Journal, August 12.*

LINES AND LINE CONSTRUCTION.

An illustration and short description of a method of grounding any wire which may break in a span over a high-tension circuit. The illustration indicates that contact will be made with the grounding strip before it can make with the high-tension line, so that the efficacy of the whole structure will depend upon the excellence of the electrical contact of the device.

Telephone Conduits in Mexico.—SITZENSTATTER.—*Telephone Journal, July 29.*

There are not many installations of multiple duct concrete conduit material on this continent, and a notable novelty is the installation, in the City of Mexico, of such a plant. The sections are one meter long and are round in all cases. The number of ducts varies according to the requirements, being as few as four and as many as thirty-

seven. The sections are joined to each other with hot asphalt. In this particular installation, the duct material is made in a yard in Mexico City, the operation being merely to fill a mold with a mixture of one part cement, three parts sand and water as required, and allowing for setting, which requires about a month. The system under construction will require about 600,000 feet of duct of this kind.

Method of Cable Splicing—McLean.—*Telephone Journal, August 5.*

A most excellent description, with photographs. To make a splice, overlap the ends of the two pieces about eighteen inches; strip off the core of each for about fifteen inches; slip over one cable a piece of lead pipe eighteen inches long, and one and one-half inch larger than the cable. Unwrap the core and saturate the paper-covered wires with hot paraffin. Test the cable for crosses, opens and grounds. This method of testing is described in detail. When finished, splice the wires together by twisting, covering each twist with a paper sleeve, previously slipped over the wire. Distribute the joints evenly throughout the splice. Bind up the splice in cheesecloth, boil out with paraffin again, slip the lead pipe over the splice and solder it to the sheath of each piece with a wipe joint. Instructions for wiping the joint are in the article. A test for the proper temperature of the solder is that it shall be hot enough to charr paper.

Loading Long Distance Lines—Harrison.—*American Telephone Journal, July 22.*

In an analysis of the character of sound waves, and of the electric waves required to imitate them in telephone transmission, the author points out the character of change which takes place in a long line carrying speech. The means by which the method of Pupin diminishes the losses are explained without mathematics with delightful clearness.

Telephonic Maps—Bond.—*Telephone Journal, July 22.*

There is so much information to be recorded on telephone maps of the modern type that it is of importance to design a system which is harmonious throughout. The article gives three examples and suggests that the maps will be white with black lines indicating underground cables, red lines for aerial cables, circles for terminals, with a similar but distinguishing set of marks for aerial terminals and distributing points. Full reports shall be required and the maps shall be kept up as the standard office records of the condition and extent of the system. If the cities be large the map is best made in sections kept in an atlas.

Telephone Construction Practice—Minhinnick.—*Telephony, August.*

The sixth article of a series, and deals with poles and pole fittings. The largest saving possible in the pole line portion of an aerial plant, good results being required, is in the lengths of the poles used, and no concession should be made in diameter, quality or frequency. Ninety per cent of the poles used in this country are of some form of cedar. The life of such poles varies with the conditions of soil and climate, and may be as low as seven and as high as thirty years. Poles must be thoroughly seasoned and cut when least sap is flowing. The danger point is at the surface of the ground. Creosoting, which is a good method of preservation, is not easily done. Cross-arms are made from fir, Norway pine and yellow pine. Fir arms are not to be painted. All except the shortest cross-arms should be provided with braces. All pole fittings should be galvanized metal. Interesting details of methods of unloading poles are included in the article.

Modern Telephony—Radcliffe.—*Telephone Magazine, August.*

The seventh of a serial, and deals with line construction in aerial and underground cables. Lines carried in cables on poles cost less than if of copper wire strong enough to support itself on cross-arms, and more than iron wire similarly erected, unless the number of lines in a given route are fewer than twenty pairs. Except for short spans and light cables some form of suspension wire is necessary, to which the cable is hung by means of metal or tarred hemp hangers. The principal requirement of cable erection and maintenance is that the lead sheath shall be kept absolutely continuous except when splicing is being done, and then every precaution should be taken to dry the core before completing the splice. Instructions are given for testing out the conductors for identity after splicing is completed. In placing cables underground some sort of tubes must be provided and these must enter manholes or vaults at intervals. The author mentions vitrified clay, iron and wooden tubing as forms of conduit material.

The Life of Telephone Poles—Finance, August 19.

During the past year, the forestry service, co-operating with two large users of wooden telegraph poles, has been investigating methods of seasoning and treatment. Five experimental stations conducted the investigations, which included methods of testing for loss of weight due to drying. The experiments also attempted to saturate the lower parts of poles, as it is the portion near the ground line which decays most rapidly and with the worse results. If the whole pole needed to be creosoted, it would be merely a money problem to determine whether to use more untreated than a given number of treated poles; but if an effective method of treating a small part of the length of a pole can be found there is much more hope that treatment will prove profitable to the users of poles.

The Trouble Force and Its Work—Kneisel.—*Telephone Magazine, August.*

OPERATING.

The trouble clearing department of a telephone exchange is an essential one, and contributes in direct measure of its efficiency to the correctness of operation of the system. Most such organizations are in charge of the wire chief who is assisted by several trouble clerks, and by a force of trouble hunters who clear the faults reported to them. The article is illustrated by two photographs and a sample card for recording troubles.

Buffalo Chase by Telephone—Washburne.—*Telephony, August.*

A story in a popular vein, in which the telephone played an important part in a complicated situation.

Special Information by Telephone—McMeen.—*Telephony, August.*

A note of a system enabling such information as the location of a fire to be given the subscriber without requiring that they call the central office in the usual way. The object of the arrangements is to enable regular exchange service to be continued in small cities while a fire is going on outside of the central office.

Telephone Train Dispatching—Pearson.—*Western Electrician, August 5.*

The author of the paper is the chief train dispatcher of the Indianapolis & Eastern Electric Railway, on which the telephone system of handling trains is used exclusively. The method of operation reflects great credit on the systematic way in which the rolling stock is moved, and on the accuracy, heretofore much questioned, of the telephone as compared with the telegraph for this purpose. It seems that the conclusion ultimately may be reached that if as great care is taken in making the record, there is as great accuracy in the intelligence received by sound through the telephone as in the intelligence received by sound through the telegraph. The company in question issues definite printed instructions covering all the points of operation and keeps full record at all steps.

The Experience of Managers—Hughes.—*Telephone Magazine, August.*

Some analysis of the requirements of good service and the means which managers may utilize in its production. An important feature is that service complaints should be secured from every possible source, and when secured should be recorded. When communicating with a subscriber concerning a complaint it is to his satisfaction and that of the company that the details of the difficulty be made known. It is of further advantage after the removal of the trouble, to communicate with the subscriber within a few

days, and ask if his service is now satisfactory. It is urged as important to make the work of operators as interesting as possible and to inform them frankly of the details of service given and the identity of those operators reaching the highest standard in various details. An interesting and new suggestion is that it is of advantage to have the routine service tests made by operators themselves, who are relieved from the usual switchboard duty for that purpose. The suggestion is so simple and manifestly contains so many advantages, that it would seem valuable to be extended.

Buffalo, New York, Independent Telephone System—HARBISON.—*Telephone Magazine, August.*

GENERAL.

A description with six photographs of the 18,000-line central office equipment of the Frontier Telephone Company.

Fighting Forest Fires by Telephone—DWIGHT.—*Telephone Magazine, August.*

The increase in the number of forestry associations has crystallized the effort to preserve timber from destruction by fire. One of the most important adjuncts to the work of the fire wardens is the telephone, and already considerable losses have been prevented by this means.

Armour Institute Telephone Engineering—Sound Waves, July.

An illustrated description of the course in telephone engineering introduced in the Armour Institute of Technology, Chicago, during the past year. As so much of the telephone business has to do with the intricacies of circuits and apparatus, no small part of the efficiency of this particular school is due to the attention which is given to familiarizing the students with the details of devices and circuits.

Telephone Exchange Instrument Departments—COAR.—*Western Electrician, August 12.*

By the instrument department in this connection is meant the place where telephones are assembled and given to the installer. The assembly should be made in a work shop well equipped with tools, benches, soldering devices and other essentials. The soldering coppers are recommended to be heated by electricity, with devices for taking up the slack in the cord. All the small parts continually required by the men are to be kept in convenient places and good order. Whatever may be the records which are required as to the equipment furnished to the subscriber, the routine for taking this record should be planned in advance and carried out with system. The installer's tool outfit is specified. The tools required in special cases should be kept on hand to be used when needed, but are not to be carried continually. The intelligent suggestion is made that the installer should give advice as to instrument location when asked for it. A number of shop "kinks" are given, including a disinfectant for receivers and transmitter mouthpieces, methods of renewing hard rubber parts which have become discolored from age and use, polishing wood and metal, including polishes for nickel work and iron and steel. As a very large part of the success of a telephone company depends upon the little bits of satisfaction enjoyed by its patrons, this article is in the line of a great necessity.

Simultaneous Telephony and Telegraphy—The Transmitter, Australia, July 1.

An instructive article dealing with the principles upon which telegraphy may take place over a telephone circuit without interfering with the integrity of such transmission.

Lead Soldering—SCHOOP.—*Electrochemical and Metallurgical Industries, July.*

For the reason that the proper installation of storage battery elements requires that the terminals be joined with the least possible resistance, some form of soldering is necessary, and the best is one which melts the lugs and allows them to flow into one. In the manufacture and repair of the lead-lined tanks which contain large battery elements, a similar method is preferable, as ordinary solder, containing tin, is not suitable. The article describes four ways of lead burning, three of which involve the use of a flame as a tool as no soldering iron method is suitable. One flame is of hydrogen gas and air, another of hydrogen and oxygen gases, the third is of oxygen gas and illuminating gas of commerce, while the fourth method does not involve the use of a flame, but is that of electric welding.

Terminals and Distribution Board—ABBOTT.—*World and Engineer, July 22.*

When all telephone lines were aerial it was very natural to bring them to a small house on the roof of the telephone building; when their number became great the task was more complicated. When the plan of bringing lines into the building in cables was adopted, the method of treatment was considerably modified. The article contains eleven figures, illustrative not only of different forms of terminating and cross-connecting apparatus, but of central office protective devices as well. It is quite the general practice to mount these protective devices on the distributing board, one set of permanent cables being run from the protectors to the switchboard, and another set from line terminals outward toward the subscribers. The running of suitable wires between the protectors and line terminals will thus connect any line with the selected switchboard circuit which is to serve it continuously until a change is necessary. For the reason that it is advisable to make changes in the location of the line signal without making a change in the identity of the subscriber's number, the intermediate distributing board came into being, and some attention is given to that device in this article.

Maintenance of Underground Structures—HUMISTON.—*Telephony, August.*

A second installment of a paper. There are five important considerations to be observed in the construction of a manhole, these being the desirability of ventilating the system, the character of the top, sewer connections, the possibility of having to maintain apparatus in the vault, and the removal of obstructions. Ventilating covers are not always effective, as in northern cities the openings are closed by snow and ice. It is possible to prevent gas collecting in vaults by keeping the whole conduit system under air pressure. Vault tops require special attention to prevent excessive rusting of supporting irons, and to provide for carrying away the moisture of melted frost. Sewer connections require to be specially guarded against stoppage by waste material likely to be carried into them from the vault. In providing for special apparatus, such as loading coils, terminals or junction boxes in vaults, it is well to provide that these shall receive particular attention in the way of inspection and cleaning. Where it is impossible to remove existing pipes and they must be left passing through the tops of vaults, sufficient depth should be left below them for the necessary operations required in the vault. Protecting underground cables against damage from electrolysis is not a simple matter in a system involving many electric power stations. The usual bonding method is not entirely satisfactory in such condition, and the best protection is that which breaks the armor of the cable into sections insulated from each other.

Wire Chief's Test Circuit—American Telephone Journal, August 12

A clear drawing and description of the necessary arrangement of keys, voltmeter, sounder, and listening circuits, required for testing subscribers' lines.

Loading Long-Distance Lines—HARRISON.—*American Telephone Journal, July 29.*

The second article of a series, and describes the practical details and their relations. The coil which is inserted in the line consists of a circular ring of insulated iron wire, upon which are wound two coils of medium sized copper wire. The whole device is sealed into an iron box, and one of the coils is connected in series with each of the line wires. The result is that the waves of high frequency which otherwise would be lost are preserved for a useful result, and the line is improved for the lower frequencies as well. The author reproduces the formula for determining the attenuation constant, and describes in some degree

other details of producing the coils and determining their frequency in a circuit.

Measuring the Capacity of Cables—DEVAUX-CHARBONNEL.—*Comtes Rendus, June 13.*

Several methods are already in existence for measuring the electrostatic capacity of conductors. A new one is here suggested, and contemplates connecting a known condenser in series with the unknown condenser which is formed by the wire under test, the insulating material, and the earth, the other wires and sheath. One of the advantages of the method, for which the calculations are not greatly complicated, is that it is in a large degree independent of the insulation resistance. A ballistic galvanometer is required.

Design and Construction of a Telephone Plant—SLIPPEY.—*Western Telephone Journal August.*

One of the articles of a series, and treats the determination of the location of central office. Two methods are referred to, by either of which, with the locations of subscribers noted on maps, the theoretical best position for the central office of a district may be determined. When this has been done, a comparison of real estate values and the costs of the wire plant will determine the most desirable position. In all exchanges operating 500 lines or over, ownership by the telephone company of real estate and buildings is recommended. For a central office building the author recommends the use of concrete with expanded metal and other features of complete fireproof construction, including wire glass, metal window frames, and marble surfaces.

Development and Future Tendencies of Telephony—CLEMENT.—*Electrical Review, Aug. 19*

A paper prepared for the convention of the National-Interstate Telephone Association annual meeting in Chicago. For the purposes of this paper, the time of thirty years, in which all telephone history has been made, is divided into several distinct periods. In the first, during which telephone communication was as crude and surrounded by limitations as was the apparatus itself, there existed the significant fact in that almost every important departure of the next period was foreshadowed. In the second period the magneto generator and self-restoring drop, with an improvement in the form of spring jack, enabled important broadening of the commercial scope. In the third period of ten years appeared the two present forms of central office mechanism, these being the manual common battery system and the automatic method. It is the opinion of the author that whether or not completely automatic systems shall be found ultimately satisfactory, it is most likely that a combination of automatic and manual methods will be that which will survive. A slight reference is made to such a combination designed by Mr. Clement himself, in which calls are received on answering jacks, as in manual boards to-day, but in which thereafter automatic mechanisms are utilized. In addition to the advantages of reduction in cost of equipment and switching operations, there is a distinct advantage in that the method can be applied to existing switchboards without changing their circuits, and without sacrificing any of their present advantageous features. Another semi-automatic plan recently has been mentioned by Mr. Dean, and has for its object to disconnect lines the instant the connected subscribers have hung up their receivers. It is the opinion of the writer that substation instruments have reached a very high point of development and that the future will not bring radical changes. It is stated that a repeater of a practical character may have been produced already.

Wireless Telephone Transmission—KNEISEL.—*Telephone Journal, August 5.*

A description of an interesting phase of inductive speech relations between two circuits. The transmitting circuit consists of a transmitter, battery, and a winding of wire, this being a fixed coil, in one instance of eight turns of No. 0 wire buried in the earth. The receiving end consisted merely of a receiver or pair of receivers in series with a portable coil of wire, in which some induction would take place unless the planes of the two coils were at right angles to each other.

The Phenomena of Lightning—HARRISON.—*American Telephone Journal, August 19.*

While the danger of injury to persons and to property due to lightning discharges has been in existence from the beginning of time, certain phases of this danger have been augmented by the development of electrical industries. In some degree, the problem of protecting persons and apparatus from damage from this cause has been complicated by the change from single to double telephone circuits. This article, which is the first of a series, inquires into the nature of lightning discharges, describing them as possessing the qualities of high tension, low current quantity and oscillation. The fact that these discharges are oscillating in character is one which assists largely in explaining some of the previously mystifying results, and in addition helps one to predict what is likely to happen and to make arrangements for prevention and protection with greater likelihood of success.

Telephone Problems in Large Cities—DOMMERQUE.—*Telephone Magazine, August.*

The enormous increase in the actual and possible telephone saturation of large cities in recent years not only has confronted the telephone engineer with a new problem, but has increased the appreciation by management and technical individuals of the importance of solving situations well in advance. The author includes in his study cities of 100,000 inhabitants or more. It is his belief that while a city properly to be called large requires that its exchange be one including a plurality of central offices, the quality of service is distinctly poorer with such an arrangement than with one office. In his opinion the ideal telephone exchange is one with a single office containing a manual multiple common battery switchboard. At present the maximum limit of such an office is 20,000 lines, the limitation being the length of the operator's reach. With party line service and private branch exchanges 20,000 lines will handle more than 20,000 stations. The actual number mentioned by the writer as possible to be handled, is 40,000, being a ratio of lines to the station of fifty per cent, which is probably twenty per cent lower than the average of present conditions in cities which he would call large. As a means of retaining the advantage of quick central office service, even at the expense of long and expensive lines, the division or group system is re-suggested. The ideal exchange first described would thus take the form of having a single central office without an office name at all, but would require the subscriber to choose among groups in that office by doing something more than removing the receiver from the hook to make a call. For reasons which he gives, the author concludes that a group system of more than two divisions is not to be considered. It is commented of the Strowger automatic system that trunking is involved in making every connection, and this at the expense of complicated apparatus.

Signaling Over Composite Telegraph Lines—HACKLER.—*American Telephone Journal August 19.*

On account of the fact that telephone lines equipped with telegraph apparatus in which two Morse circuits are secured from one telephone circuit, it is quite impossible to ring distant stations by means of the usual low-frequency ringing currents. This author proposes a means of signaling by the use of a tone easily carried by the telephone circuit. The receiving device is a hand telephone, and in this particular suggestion the transmitting device is a unit containing a transmitter, receiver and induction coil adapted to "hum," as is true when a receiver is brought very close to the mouthpiece of a transmitter and slightly agitated. The writer suggests the arrangement for use as a "howler" for calling a subscriber who may have left his receiver from the hook.

Questions and Answers

CONDUCTED BY J. C. KELSEY

In Fig. 1, what would be the length of distance *X*, so that a ringing current through coil *B* would not affect the armature enough to make the contact on upper spring, and still would be wound with enough retardation for common battery work? The coil *A* would be short-circuited while ringing. Also would there be any retardation in a differential relay connected so that coils would buck each other?—E. H. C.

When the coil *A* is short-circuited, during the act of ringing through coil *B*, it looks as if what magnetic energy induced in the *A* end of the coil from the coil *B* would be readily absorbed by the short-circuited coil, and would have no effect on the armature. The length *x* could be two-thirds of the total length, and still would allow the coil *B* to offer enough retardation for any common battery work. As this question comes from Denver, it must come from one engaged in work on Bell circuits. Even if I were able to answer it with full knowledge of the actual length of *x*, which knowledge I do not possess, for I am only guessing, I should hate to steal thunder from the great chest of knowledge carefully guarded by the Bell engineers. When I contemplate this wonderful knowledge chest, with its millions of facts, so carefully

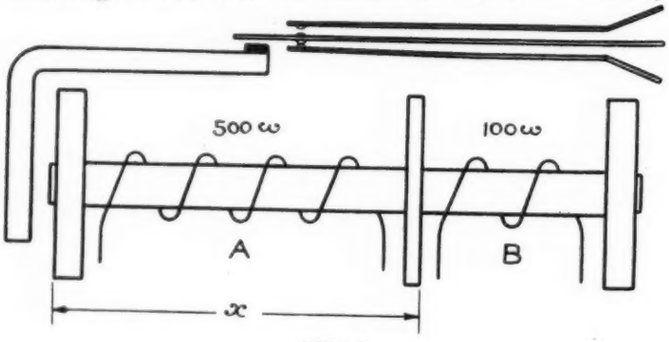


FIG. 1.

guarded from the poor Independent struggler in telephone engineering, I am much impressed with the fact that curious Pandora possibly was premature.

Relays wound in tandem, differential, do have retardation for alternating currents. There is a chance here for magnetic energy to be generated, and returned to the circuit. That means self-induction and retardation. Coils wound concentric, or in such a way that no magnetic energy is induced, where the effects are neutralized electrically, will not offer retardation when differentially wound.

The writer has had some rather peculiar experiences in connection with the DeForest wireless station here, which he would like to relate to you, thinking that the facts may be of interest to your other readers, who are bound from time to time to encounter the same trouble from static currents emanating from wireless sources, as they increase in number. Enclosed is a sketch of the location, Fig. 2, and the approximate angles of the disturbed circuits in regard to the antennae. The trouble was first noticed on a desk telephone in a building on the roof of which was the wireless station. The induction was so heavy that telephone transmission was not only out of question, but by presenting the knuckles to the desk stand metal a static spark one-half inch long could be drawn.

After various experiments, such as bonding the metal work on the roof, fire escapes, etc., which reduced the induction somewhat, the telephone wire was cut at point *X*, and moved slowly to *A*, toward which point the static current gradually lessened, but at that point the Morse code from the wireless station could be clearly read by standing on the ground, and presenting the finger to the end of the wire. At point *B*, however, only two feet away from *A*, there was no discharge that could even be detected with a receiver. Of course, it was the varying angle with the antennae, but it seems that a theoretical explanation would be interesting. Perhaps it should be explained that the telephone line in question terminated in a copper-covered pole top terminal about fifty feet from the sending station. The only other line in this terminal head, however, that was affected, was one running diagonally across the street to a street telephone attached to a pole at *D*, with an extension bell on a pole at *C*. This case was cured by grounding the metal frame of the extension bell at *C*. The first case was remedied by bringing the line in from another pole by route *E*.—H. G. H.

Here is a case of static induction trouble, which will go hand in hand with the alternating high tension trolley. Both troubles are eliminated by putting the affected object at earth potential, because these static stresses produce charges that are earth seeking. The moving of the wire from *X* to *A* and *B* simply consisted in placing the telephone wire where it would intercept the least number of lines of force. Running the new wire in the way of *E*, placed the incoming wire to the desk stand in line with the outgoing waves, and decreased the cutting of lines of force

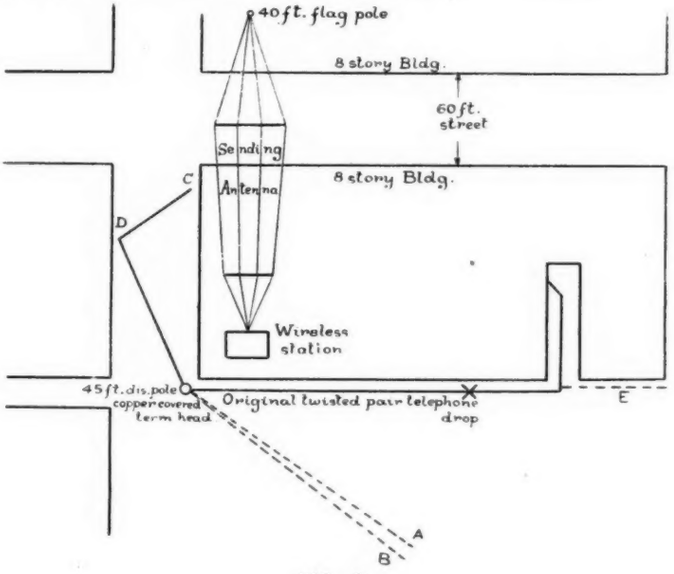


FIG. 2.

to a minimum. This is a very interesting proposition to telephone people. Very nearly everything electrical effects the telephone, so marvelously sensitive are some of the receivers.

What do you think of telephony as an occupation to one who is willing to devote mind and body to its advancement wherever employed? Have worked at the business for three years, more or less, and am considered a good workman by other telephone men with whom I am acquainted. However, I have been out of a steady position for some time. All methods of securing employment in a desirable place have failed, all returning the same answer, "We do not need a man now, but will file your application," or "Your experience is not sufficient for you to be of service to us." I know what I can do, and will not make application for a position that I cannot fill. I can build as pretty a cross country line as any man, and can install any magneto system made. Have had no experience with common battery, but believe I would be as successful with that as I have been with local magneto apparatus.—M. C. W., Indiana.

This question is not exactly technical, and may not have a rightful space in these columns. But the question is a typical one, and echoes the cry of many a young man desirous of a start in the world along the right direction. I have heard that expression more than once: "You have no experience which makes you useful to us." It is a cruel one, yet a just one. A young fellow has to gain experi-

ence. Someone has to give him a chance. Young men have to be trained from rawness, or soon the experienced men will be extinct. A young man, or any man, to get a good salary, has to know something or do something by which his employer can profit. It is unfortunate, and also fortunate—especially from the Independent telephone standpoint—that the fundamental features of telephone engineering are so simple that the grocer, harnessmaker and lawyer can plunge into it, and make a telephone proposition a technical and business success. If this is true—and it is true—a young man, whose experience is limited to what the butcher, grocer, and lawyer can do, is likely to be out of a job occasionally and then when working, will not command the pay.

In M. C. W.'s case the only remedy is to strap his spurs on his back, and look for work in person. Go into any telephone office of 1,000 lines or more, and the chances are that you will be told to go to work. If you can go to work, and get busy, showing that you know something to their advantage, your name will be on their pay-roll in heavy ink. Go to Indianapolis, as all good Indianans should, and see what Mr. Norton or Mr. Goldrick can do for you. Those large concerns are usually begging for men. There is enough doing in old Indiana to let you exercise your ambition.

The great trouble with the rank and file of telephone workers is a singular dislike to study. Many a man has worked up from the basement, but he was not the man whose chief accomplishment consisted in spitting ten yards, and abusing the chief officers. He was the one who read, who studied, who thought of telephone problems day and night. Really, the telephone world is begging for young men to take responsible positions. But to qualify, one has to be a student. Not necessarily a college student. Some of the best men in the field never saw a college. It is not necessary. It is necessary to some minds, and to others it would be but a waste. I could mention dozens of brilliant engineers who never went to college. And I can mention dozens who have. The man succeeds who thinks in his waking hours and in his sleep. He must waken with a thought entirely new.

There are thousands of cases like the one at hand. If one wants to rise, he must go where there is a chance. He must join the madding crowd. He cannot stay in a place where he can not use his talents. Put your spurs on your shoulder and start out with your mother's blessing. Read all books carefully and digest them. Think for yourself. As the years go by, you will be seen, heard, and appreciated.

The present college boy gets a job when he graduates. The companies take him, pet him and raise him on their diet. It reminds me of old English times, when orphan children, or even children of kings, would be turned over to people who would permanently deform them—for instance, enclose the lower limbs, so that growth would never come to them, or deform their heads, or faces, that they might exhibit them as monstrosities. Not that our freshly hired graduates will be so exhibited by their employers, but they will be deformed in more ways than one. The man who has never sallied forth in search of any old job, out of sheer necessity, has never experienced one of the most valuable emotions of his life. A man who has had sheer necessity confronting him, and who finally succeeds, has more charity and more of the milk of human kindness than the pampered youth, who was taken from an incubator, and trained to his employers' pet hobbies. I predict much sorrow for the incubator man.

Telephone engineering is an occupation worthy of any ambitious man. It holds forth countless inducements, has countless unsolved problems, and has a boundless future before it, practically. The present systems are all wrong, but at present none can suggest the right way. Any man has the privilege of putting the science on its proper foundation. Telephone engineering, like any other form of engineering, has no room for the sluggard. For that matter, any business is fit for any man, if he will but put in his efforts.

We have a line 36 miles long, No. 10 steel wire, with eight bridging stations, with 1,000 and 1,600 ohm bells, grounded circuit. We have trouble in ringing central. The ones nearest can ring in all right, but the farther one gets from central the weaker it rings, and at the end of the line it does not ring at all. It is run metallic two miles from town, and then grounded.—W. C. B.

Fig. 3 shows this stunner. First of all, why waste that two miles of wire which you run into the country? Why not ground at the central office, and put some subscribers on it by itself? It is not a good thing to have mixed bells on the line. Some are 1,660 and some are 1,000. By rights, all should be one or the other. Then the drop is either sadly out of adjustment or of too low resistance. You should adjust the drop, or find another in the board more sensitive. You do not state whether any party can

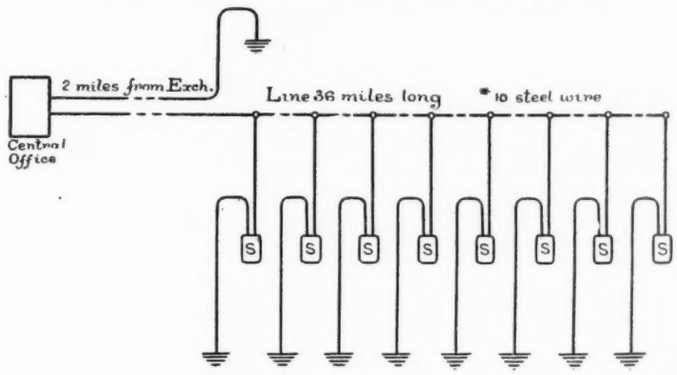


FIG. 3.

ring all the bells. It is clear that the ringers take all the current coming from the end instrument, and you need a most sensitive drop. If you cannot adjust the drop any finer, try others. It is possible that the ground at *g* is very poor, and has a high resistance. Put it at the central office, where you can occasionally pour a bucket of water on it.

In this town the Independent telephone company does not place arresters at the subscriber's instrument, on pure metallic service, but protects cable terminals from lightning by a maxstadt fuse arrangement, which not only blows, but allows the static charges to escape to ground. The Bell company puts arresters at all instruments and claims that the overhead and underground cable terminals do not need any protection beyond the tubular fuse. Which is preferable? It strikes me that a lightning charge would have a tendency to divide between the arrester at the subscriber's instrument and the arrester at the switchboard, and thereby be liable to damage the cable. On the other hand the maxstadt fuse arrangement is a nuisance. In fact, both systems seem to have nuisance problems, such as running around to each subscriber after every heavy static charge.—J. L. S., Iowa.

I have always claimed that when it comes to asking, or telling which is best, on a proposition involving the action of static charges, that I do not know. Undoubtedly, it is poor practice to put in arresters at each metallic subscriber's station. The Bell company has a great many more party line grounded ringing subscribers than it has full metallic. It realizes that when 70 per cent of the stations absolutely need protection, they might as well standardize the practice, put the carbon arrester everywhere, and cut out the static protection directly at the cable terminal head. There is a chance that the charge will divide, part of which would tend to go through the cable to the exchange ground, and the rest through the outside line to the subscriber's ground. It is possible that the subscriber's ground will offer the path of lease resistance, and take

the most of the charge. A cable is always subjected to static strains in every storm, as is evidenced by the snapping and crackling of the arrester panels. But it is an exceptional case where a cable is really damaged. A cable is harmed much more by bullets and bends, caused by defective hangers, than it is by lightning. I have seen a mile-long cable subjected to a terrible strain, which static charge entered the cable, and did not make any showing of trouble, until it got into the wool cable at the switchboard. It broke loose fifteen feet from the end, and the only thing noticed at central office was one line damaged. Not a fuse was blown, not an arrester affected. Simply a mystery. Therefore, my claim, "It is all a guess."

The Independent systems are mostly single party metallic, but the time is here for party line service. What a fool idea is the single-party scheme. There is no use of an arrester at a metallic subscriber's station. Then it is necessary to have an arrester at the terminal head. Whether carbon or maxstadt, it matters not. Just what is wrong with the maxstadt proposition I do not know. I do know that these fuses get loose, and that they open up without cause. But in general the scheme looks good. It is undoubtedly better to send a man to a cable pole to clean carbons than to chase him over a whole district for the same purpose. It seems to be the case that large cities do not have much severe lightning trouble. There are so many discharge points. Fortunately, it is large cities that have underground and overhead cables. Accordingly, they seem to suffer but little.

My answer would be this. The Bell system is all right, because the Bell people have to protect their party line subscribers. A station and an exchange discharge point is enough for practical purposes. The Independent system is all right, because conditions do not demand subscribers' protection; hence, a discharge point somewhere on the line before the cable is reached.

SUBMARINE SOUND TELEGRAPHY.

The Cunard Steamship Company is fitting its entire fleet with the submarine signal bells, such as have been tried successfully on the three big North German Lloyd liners, Kaiser Wilhelm II., Kronprinz Wilhelm, and Kaiser Wilhelm der Grosse. The Lucania is provided with the bells and used them with good results on the last voyage. The Caronia, Campania, and other big Cunarders are to have the new system. The sound of the bells travels through the water and is intercepted by receivers attached to the inside of the vessel near the bottom. The officer on the bridge hears the signals through a telephone and can tell exactly the direction the sound comes from and the distance his ship is from the lightship or land station.

It may be remarked that submarine signaling, or sound telegraphy, as it is called, considered in connection with shipping interests, is vested with an importance second only to that of wireless telegraphy, the full practical value of which has scarcely yet been recognized. One of the most formidable problems of coastwise navigation by which mariners are confronted is the difficulty of determining the direction from which fog-bells and signals come, the apparent direction of the location of the sound being dependent to a large degree on the condition of the atmosphere. If vessels could run from lightship to lightship infallibly by sound, as they do by sight in fair weather, the improvement would amount almost to a revolution of coastwise traffic. An article descriptive of deep sea sound telegraphy recently appeared in the Telegraph Age. The present interest evinced in the subject makes the reproduction of the same at this time opportune:

"Upon invitation, one of the representatives of the Scientific American, on a very stormy and windy night took the trip from New York to Boston for the purpose of witnessing the practical working of the system aboard the steamer Herman Winter, and noted with much interest the distinctness with which signals were exchanged when the ship was seven miles distant from the ringing bell. It is a well-known fact that sound travels faster through water or liquids than air, and this is taken advantage of in a novel and practical way.

"It has been ascertained that the receiver for collecting the sound vibrations need not be located on the outside of the vessel, but operates as well when clamped on the inside against the inner surface of the outer hull, especially in iron ships. The sound vibration from the bell passing through the water is communicated to the side of the ship's hull, and that in turn to the liquid or water in the receiver. This consists of a cup-shaped metal cylinder having the open end edged with rubber, and clamped against the side of the hull. Four hook-supporting arms project inward from the hull, and upon these rest two crossbars in which are hook eyebolts, the hook portion being clamped over projections on the surface of the receiver. By this arrangement the open end of the receiver is clamped securely against the side of the ship's hull, making a water-tight joint. Inserted in the top of the receiver is an electric transmitter, something on the order of a telephone transmitter, from which wires are run to the pilot house of the ship. The wires are connected to a battery and the primary coil of an induction coil in the usual way, and the telephone receiver to the secondary coil.

"It is obvious that when a sound impulse is given to the liquid in the receiver in the hold of the ship, it will be transmitted electrically to the telephone receiver in the pilot house. As the sound travels through the water in every direction from its source, it is found that the impulse will be stronger and louder on the side of the ship nearest to the source. By this means the direction of the sounding bell is ascertained, for by listening to the telephone receiver attached to the starboard side water receiver, and then switching over to the port side and listening to that telephone receiver, the ear detects at once which is the louder sound of the two. This was determined experimentally by turning the ship around in a large circle, when the difference in the sound from one side to the other was very noticeable, according to which side was nearer or farther away from the sounding bell. In foggy weather signals of this kind are readily heard, regardless of which way the wind is blowing."

INDIANA TELEPHONE STATISTICS.

Manager Thomas J. Bromley, Jr., of the Delaware & Madison Counties Telephone Company of Muncie, Indiana, has compiled statistics showing the growth of Independent telephone companies during the fiscal year ending July 20. The data has been computed from the tax returns of the 305 companies operating in eighty-four counties in Indiana. The total investments of these concerns, capital and bonds, have increased during the past year $3,718,458.90, or fifty-one per cent. In 1904 the companies were operating 106,554 telephones and in 1905 there has been an increase of 26 per cent, or 27,320 telephones. The gross annual earnings in 1905 exceeded those of 1904 by $1,055,145.88, or 77 per cent. The gain in net earnings for the same period was $118,115.56, or 35 per cent.

Manager Bromley stated that the Independent telephone companies in Indiana have made immense progress during the fiscal year just closed. The thousands of new telephones that have been added show that a great deal of new work has been done. The increase in earnings also show that the plants have been operated at a large profit.

In no other state in the Union at the present time are the Independents more prosperous or growing at a greater rate, and the future is the brightest in the history of the movement.

Annual Outing of Cuyahoga Employes

THE fame of the Cuyahoga Telephone Company of Cleveland, Ohio, as a progressive, up-to-the-minute Independent organization has spread far and wide; in fact, the telephone fraternity have come to regard it as the embodiment of all that is enterprising, and its well-known generosity toward its large force of employes has won for it the highest measure of regard, not alone in Cleveland, but throughout the entire country. Each year the Cuyahoga company sets aside a day on which it gives its small army of operators and other employes an outing; the event is known as Telephone Day, and this year the date of the picnic fell on Saturday, August 5. The officials of the company had anticipated that the affair would be gratifying and enjoyable to all concerned, but it proved to be a success far beyond their most sanguine expectations, no less than 10,000 people taking part in the festivities, which were held at Luna park in the afternoon and evening.

In order that all of the employes might participate in this outdoor frolic half of them worked in the afternoon and the other half in the evening, thus giving all at some time in the day an opportunity to throw dull care to the winds and, in the words of James Whitcomb Riley, "jes' be glad," if only for a few brief hours. The working force of the Cuyahoga totals 600. In addition to this number there were present at the picnic the families, relatives and friends of this lively regiment of employes, and in the evening several thousand Cuyahoga subscribers forgot their troubles and made merry with the "telephone bunch" at Luna park. Invitations also were issued to the directors and stockholders, the city officials, the young ladies operating private branch exchanges in the city, and managers and operators of Independent telephone exchanges in the vicinity of Cleveland, many of whom were present.

O. F. FRENCH.

W. R. WOODBURY.

When the noon hour arrived on Saturday no less than 5,000 persons had assembled on the grounds, and at 1 o'clock the fun began. The programme as arranged and practically carried out follows:

Baseball—Jack Dunn, umpire; prize, $10—Cuyahoga Telephone Company vs. Electrical Workers.

Immediately after ball game at picnic pavilion:

Opening address—J. B. Hoge, secretary Cuyahoga Telephone Company.

Address of day—F. S. Dickson, president Cuyahoga Telephone Company.

Tug of war—Prize, $5—Picked team from construction department vs. all other departments.

Young women's race (open to all departments)—First prize, $2; second prize, $1.

Wrestling match—Gold medal—D. B. McIntyre, champion mixed style wrestler of the northwest vs. George Getzien of Cleveland. One fall Cornish style; one fall Greco-Roman; one fall catch as catch can.

Fat men's race—(Open to all over 200 pounds)—First prize, $2; second prize, $1.

100-yard dash—(Open to all)—First prize, $2; second prize, $1.

50-yard dash—(Boys under 15)—First prize, $1; second prize, 50 cents.

50-yard dash—(Girls under 15)—First prize, $1; second prize, 50 cents.

100-yard dash—(Married women)—First prize, $2; second prize, $1.

Wheelbarrow race—(Ground men)—First prize, $2; second prize, $1.

Throwing hand line—(Cuyahoga linemen)—First prize, $2; second prize, $1.

Potato race—(Open to all)—First prize, $2; second prize, $1.

Prize waltz—(Young women)—Prize, $2.

Employe having largest family on ground, 50 pounds flour.

The day's sports were started with a ball game between the Cuyahoga team and the Electrical Workers, the former winning by a score of 19 to 0. The chief feature of the game was said to be "Jack" Dunn, city electrician. But it remained for the ball-tossing company officials and office boys to furnish the real excitement of the day. The average weight of the officials was 200, and of the office boys 54. O. F. French, general manager of the company, captained the officials' team. The other players were W. B. Woodbury, assistant general manager; F. B. Schrader, general superintendent; J. P. Boylan, superintendent of service; D. B. McIntyre, general foreman; G. W. Keely, head of record department; R. W. Judd, treasurer; C. H. Nichols, assistant treasurer; Superintendent of Switchboards Plummer, and Superintendent of Equipment Brockway. After a fierce struggle that made the ordinary ball game appear like a game of dominoes between two invalids, the office boys were proclaimed the victors by a score of 5 to 3.

The tug of war was won by the team from the construction department, under Captain Bruce Austin, the team from all departments, under Captain William Chase, giving them a most exciting and amusing pull for over two minutes.

A feature of great interest was the wrestling match between D. B. McIntyre, champion mixed style wrestler of the northwest, and George Getzien, assistant general foreman of the company. Getzien won the Greco-Roman bout in one minute and twenty seconds. McIntyre won the Cornish in one minute thirty seconds and the catch-as-catch-can in twelve minutes and thirty-five seconds. This last bout was very exciting, Getzien getting out of some very tight holes in a way that called forth the cheers of the crowd.

The boys' dash was won by George Tod; Howard Colson, second. Miss L. Kitchen won the girls' race, with Miss N. Yeideman second. The victor in the fat man's race was George Getzien; H. Sands, second. The honors

in the potato race went to D. Powers, first, and C. Wolf, second. Miss Z. Allen won the young ladies' race, and in the 100-yard-dash L. Rosenberg pulled down the prize, with W. H. Chapple a close second.

James B. Hoge, secretary of the Cuyahoga company and president of the National-Interstate Telephone Association, was chairman of the day, and made the principal address in place of President F. S. Dickson, who was kept at home by the illness of his wife. It was replete with good points and aroused much enthusiasm.

Misses MacWeaver, Edna Tuttle and Alice Marshall had charge of the girls' end of the picnic. They helped conduct the races and the prize waltz in the evening.

The employes of the Cuyahoga had plenty of money for their picnic, as the company completed the distribution of the profit-sharing proceeds for the first half of the year the day previous. The distribution amounted to seven per cent of the salary for the six months, and was the largest percentage and the largest amount paid out at any of the distributions. At the distribution six months ago the amount was 6½ per cent, and one year ago the distribution was six per cent. The amount apportioned by the company to the employes is growing rapidly each half year, as the company is adding continually to its list of employes. In spite of the growing number of workers the distribution increases in importance for the individuals each period.

It requires a long time to get the distribution completed after the half-year period is closed, because there are so many employes who come and go, and who do not stay long enough to share in the distribution. The entire payroll has to be revised and made ready and then the computations made for each one, so the clerks and auditors have an abundance of extra work to keep them busy during January and July. It required a lot of hustling on the part of the clerks to get the rolls ready for the payment to be made ahead of the picnic, but the work was accomplished, and on Friday morning, August 4, the last of the payments was made.

The profit-sharing plan was introduced for the purpose of inducing the employes to remain permanently with the company, President Dickson arguing that a force well organized and experienced is worth a great deal more to a company than a changing force. He believed that when a campaign for the development of business was undertaken, there would be more effective co-operation of all employes if each understood that he was to share fairly in the larger profits for which the company was working. He says the results have more than justified his belief. There has been hearty co-operation from the employes in all department, that has not only enabled the company to enlarge its business, but to handle the growing volume with greater satisfaction to the public. The amount to be distributed for the first half of this year was in excess of $8,000.

The committees in charge of this highly successful and thoroughly enjoyable affair were:

General—O. F. French, W. B. Woodbury, F. B. Schrader, J. P. Boylan.

Reception—F. S. Dickson, J. B. Hoge, R. W. Judd, W. L. Carey, Jr., B. H. Lang, M. B. Overly, C. M. McVey, O. F. French, Miss Edna Tuttle, Miss Alice Marshall, Miss Mae Weaver.

Invitations Press and Advertising—W. B. Woodbury, H. G. Hall, F. D. Allyn, F. J. Sullivan, G. H. Smith.

Entertainment and Programme—G. W. Keeley, C. H. Nichols, J. P. Boylan, I. Campbell.

Contests—F. B. Schrader, D. B. McIntyre, P. C. Davis, R. C. Criswell.

The judges were L. Addleman, D. B. McIntyre, R. Criswell. R. M. Ross was official timekeeper.

While this outing was a source of the greatest pleasure to the Cuyahoga employes it also served to make the company still more popular with the people of Cleveland.

FRANCHISE EXACTS BINDING STIPULATIONS.

The common council of Middleton, New York, recently granted a franchise to the Middleton Telephone Company, in which were embodied numerous binding stipulations, in substance as follows:

All the work is to be done under the direction of the common council.

All damage by the company must be repaired at its expense and where streets are torn up they must be kept in order for one year following.

No poles or wires can be placed over paved streets, but a subway or conduit must be constructed.

The company is to construct conduits in all streets where paving is contemplated, having the conduit completed prior to paving.

Conduits must be placed in crossing paved streets.

The only poles to be allowed on paved streets are to be what are termed distributing poles.

Poles may be erected on streets not now paved, but the common council will designate the streets to be used for that purpose.

The city reserves the right to determine the location of any and all poles; also to remove or change location. Poles also are to be painted, repaired or altered at the order of the city and a list of same filed with the city clerk.

The company must surrender one-half the conduit to city, the latter to rent the remaining space to any companies using a current of low potential. One-half of this rental will go to the city—the other half to the Middleton Telephone Company.

If the company should cease to do business all subways are to become the property of the city.

The city is to have the use of the conduits for fire or police telegraph wires.

The company must furnish for the use of the city, telephones not to exceed 20 in number at the rate of $1 per month.

The company must remove all poles, and enter conduits in case all other companies are likewise ordered.

The company is to pay all expenses of getting the franchise and is liable for all damages.

A deposit of $1,000 must be placed in the Orange County Trust Company Bank to the credit of the city treasurer and the franchise is not operative until the deposit is made.

THE PARTY TELEPHONE.

A Philadelphia lawyer who has a telephone on a four-party wire in his house had a recent experience of human curiosity. The lawyer's wife suspected one of the neighbors of eavesdropping. "Saturday," said the lawyer, "she had a prearranged conversation over the telephone with me, and suddenly shut me off. She explained that one of the neighbors was eavesdropping, and that she intended to have the thing stopped. 'I know the woman well,' she said, 'and the next time she speaks to me I'll insult her.' Later my wife explained that she could tell the culprit when she avoided her. Next day we went to church to make the test and met an awful shock. Not one of our three neighbors on the party line noticed us, although they had always been very friendly. My wife found the culprits all right, but she had neglected to figure on the natural curiosity of all women."

A highway robber near Mansfield, Ohio, was foiled by means of a telephone. A tramp held up a girl on a road near town, and took her watch and money. The robbery was seen by a lineman on the top of a telephone pole. By a portable telephone he called up the nearest farm house. A party of farmers caught Clark and threatened violence. The police were called and took the prisoner.

In the Financial Field

BRIGHT OUTLOOK FOR CUYAHOGA COMPANY.

CUYAHOGA telephone affairs are the most prosperous in the history of the company, and the outlook for the future is still more promising. A director of the company recently made the following statement:

"The Cuyahoga Telephone Company controls the Independent telephone situation in the city of Cleveland and the county of Cuyahoga and to-day has a total of 18,000 subscribers. The company has the following securities issued: Bonds, $2,700,000; 6 per cent preferred stock, $750,000; common stock, $1,500,000. The Electric building in Cleveland, worth $700,000, belongs to the company and is covered by the company's mortgage.

"In my opinion the cash value of the property of this company is between $4,250,000 and $4,500,000. You will note that the total amount of bonds and preferred stock amounts to only $3,450,000. This leaves a cash value in the common stock, in my opinion, of about $800,000. In addition to this the business and earnings of the company make the common stock much more valuable than the amount of cash represented by it. The following is the statement of earnings of the Cuyahoga Telephone Company:

Gross earnings for this year	$551,475.13
Operating expenses, taxes, sinking fund, etc.	302,723.88
Net	$246,751.25
Fixed charges on bonds and preferred stock	143,209.02
Surplus	$105,542.23

"This common stock at the present time is earning about 7 per cent, and, in my opinion, by January the common stock will be earning between 9 and 10 per cent. The common stock was originally $3,000,000, but about two years ago was cut exactly in two, making the common stock $1,500,000. The original shares were for $100 each before the capital stock was cut in two. At the same time the capital stock was reduced the par value of each share was also cut in two, from $100 to $50, thereby making the par value of each share $50. Of course, this makes the common stock double the value it would have been if the issue amounted to $3,000,000. The common stock will go on a dividend basis in January, 1906, of not less than 3 per cent, and I predict same will be on a 4 per cent dividend basis."

Holders of preferred stock in the Cuyahoga company recently received $59,674.50 in dividends. The earnings have for the past few months been growing at a cumulative rate, which enabled the directors to announce the declaration of the first dividend. Of the authorized 30,000 shares of preferred stock, 13,261 had been issued, the remainder being held as treasury stock in the control of the Federal Telephone Company, the holding company. The dividend on the reserve stock will amount to $75,325.50, the total being $135,000.

Messrs. Secor and Brailey of Toledo recently made a proposition to purchase additional securities of the Cuyahoga Telephone Company. They are so well pleased with their first deal that they desire to purchase another big lot of common stock. They were informed, however, that neither the Cuyahoga or Federal has any further securities it desires to sell at the present time.

* * *

KEYSTONE TELEPHONE COMPANY FINANCES.

Fisk & Robinson, who recently purchased $4,000,000 5 per cent bonds from the Keystone Telephone Company of Philadelphia in a circular just issued set forth the earnings of the company as follows:

	1904	5 months end. May 31, 1905
Gross receipts	$686,043	$323,797
Operating expenses (including taxes)	368,878	163,299
Less renewal reserve fund	58,159	27,885
Balance available for net charges	259,005	132,612

The circular further says in part: "On the basis of the earnings for the five months of 1905 the amount applicable to the payments of interest charges for the year will be $318,270, or an increase of $59,265. the accountants state further in their report that the actual cash expended for property, not including stock issued in acquiring properties or patents, was $5,053,000, and that, after liquidation of all its unfunded indebtedness, the company will have in its treasury a cash working capital of about $750,000."

Under the new management the number of directors of the Keystone company has been increased from five to eleven. To insure proper management of the concern, fifty-five per cent of the stock has been placed for seven years with a voting trust, of which George Burnham, Jr., is chairman, and the Union Trust Company trustee. The sale of $4,000,000 of the company's bonds gives the company ample funds for future extensions after paying all indebtedness.

* * *

COMPANY MAKES FINE SHOWING.

A comparative statement issued by the United Telephone and Telegraph Company shows that during the last six months the number of telephones in operation has increased from 18,140 to 18,667, the net total receipts from $5,834.77 per month to $7,222.84 per month, the gross receipts from rentals of telephones per month from $32,631.66 to $34,254.25, and the total annual gross receipts from $461,597.16 to $497,733.48. This increased business was obtained without any extraordinary expense and with no special effort. It is the intention of the company to greatly increase the long-distance service between Pittsburg and Philadelphia, for which purpose the company has sold to H. P. Taylor & Company of Pittsburg $50,000 first mortgage 5 per cent thirty-year gold bonds, of which $250,000 are bonds of that company and $250,000 bonds of the Cumberland Valley Telephone Company, principal and interest guaranteed by the United Telephone and Telegraph Company. It is estimated that the net receipts of the company will be increased 50 per cent by increasing its long-distance facilities.

* * *

REPORTS A PROSPEROUS YEAR.

The capital stock of the Citizens' Telephone Company of Grand Rapids, Michigan, has been increased from $2,000,000 to $3,000,000. The increase in the capital stock is for the purpose of erecting new exchanges and improving the old ones in the territory of the company. The old board of directors, consisting of C. F. Rood, E. B. Fisher, Philip Graham, L. J. Rindge, G. W. Perkins, J. B. Ware, Edward Fitzgerald, W. J. Stuart, Cyrus E. Perkins, Robert D. Graham and Elbridge G. Studley, was re-elected. The annual reports of the secretary and treasurer showed a very prosperous year. The report of the secretary showed that of the 1,605 stockholders, 1,068 are residents of Grand Rapids, 409 are residents of the state outside of that city and 128 are residents of 33 other states. Of the stock now outstanding

$1,330,000 is owned by Grand Rapids people, $420,000 is owned outside of Grand Rapids in Michigan and $185,000 is owned by stockholders outside of the state.

* * *

DIVIDENDS DECLARED.

Home Telephone Company, Kansas City; quarterly, 1¼ per cent.

Citizens' Telephone Company, Logan, Ohio; quarterly, 2 per cent.

Zanesville (Ohio) Home Telephone Company; semi-annual, 4 per cent.

Home Telephone Company, Monroeville, Indiana; semi-annual, 4 per cent.

Direct Line Telephone Company, San Francisco; monthly, 10 cents per share.

Tri-State Telephone Company, Minneapolis; ninth quarterly, 1½ per cent.

Twin City Telephone Company, Minneapolis; fourteenth quarterly, 1¾ per cent.

Commercial Union Telephone Company, Troy, New York; semi-annual, 3 per cent.

* * *

BRIEF FINANCIAL NOTES.

The Montgomery County Telephone Company of Red Oak, Iowa, has increased its capital stock to $41,800.

The Rock County Telephone Company of Janesville, Wisconsin, has increased its capital stock from $50,000 to $100,000.

The White Cloud (Kan.) Telephone Company has increased its capital stock from $75,000 to $150,000, for the purpose of extending the system.

The Independent Union Telephone Company of Buffalo, New York, has recorded a mortgage for $500,000, given to the Knickerbocker Trust Company.

The Home Telephone Company of Mobile, Alabama, has increased its capital stock to $350,000, $200,000 of which will be spent in improving its system.

The statement of the United States Telephone Company of Cleveland for May, just issued, shows the gross earnings to be $41,136.18; expenses and taxes, $25,764.78; net earnings, $15,371.40; surplus, $6,152.81.

The Kinloch Long-Distance Telephone Company of St. Louis has filed a deed of trust covering all of its property, to the American Trust and Savings Bank of Chicago and George W. Galbreath, as trustees for the bondholders under the company's issue of $5,000,000 twenty-five-year 5 per cent gold bonds.

The Commercial Telephone Company of Austin, Texas, has been bought in by the bondholders for $110,000. It is announced that the company under the new organization will proceed at once to enlarge and freshly equip the company's property so as to cover Texas, Louisiana, Arkansas and the Indian Territory.

A check for $2,149, representing two per cent of the gross receipts of the Home Telephone Company of Kansas City, for the quarter ending June 1, has been sent to the city comptroller. The company pays two per cent annually for its gross receipts for the use of streets and alleys for its poles and other equipments.

The stockholders of the Sandusky (Ohio) Telephone Company have decided to increase the capital stock of the company from $75,000 to $150,000. It has also been decided to arrange for a refunding of the present indebtedness of the company. A new bond issue will be made to take up all outstanding bonds.

At a meeting of the executive committee of the South Bend, (Ind.) Home Telephone Company, monthly reports were submitted, showing the affairs of the company to be in a very flourishing condition. Preparations are being made to extend the various lines in St. Joseph county so as to greatly increase the field of operations.

At a meeting of the Galesburg (Ill.) Union Telephone Company, held recently, it was voted to increase the capital stock from $150,000 to $250,000. The money will be spent partly in erecting a central exchange building and partly in constructing toll lines to Burlington, Rock Island, Peoria, Aurora, Springfield and other points.

The property of the Farm and City Telephone Company, extending through the six counties of De Witt, Piatt, Champaign, McLean, Logan, and Macon, Illinois, was purchased by B. F. Wasson of Clinton and Samuel Martin of Waynesville for $44,186.60. The property has been transferred by these gentlemen to the National Telephone and Electric Company for a consideration of $100,000.

The Kentucky state board of valuation and assessment has taken final action as to the franchise valuation of the following telephone companies: Bourbon Home Telephone Company, $60,000, its tangible property being valued at $10,500, leaving its franchise valuation $49,500; London and Manchester Telephone Company, $10,000; Owenton Telephone Company, $5,000; Bracken County Telephone Company, $4,000.

The first year of a profit-sharing plan inaugurated by the Lewistown (Mont.) Telephone Company has just ended, and all employes in the operating department who have been with the company for the past year received checks. President A. W. Farr, who put the scheme in operation, states that it has worked well and he considers that in many ways the company has really gained by giving the employes a share in the profits.

All details of the deal by which the Kinloch Long-Distance Telephone Company absorbs the Kinloch Telephone Company of St. Louis have been completed. The shares of the local company, representing the issued capital stock of $2,000,000, were exchanged, share for share, for stock of the long-distance company. The authorized capital of the latter company is $5,000,000, of which $2,800,000 has been issued, including the shares exchanged for the Kinloch Telephone Company stock.

The financial statement recently issued by the Monmouth (Ill.) Independent Telephone Company shows the company to be in excellent condition. In addition to paying the full current expenses of the year, the company has paid interest on bonds amounting to $1,482 and has created a sinking fund for the redemption of the bonds, in which has been deposited $948.48, out of which six treasury bonds have been redeemed and cancelled. The report shows a gain of $1,778.50 in receipts, and an increase of 183 subscribers over last year.

TELEPHONES USED TO BREAK STRIKE.

The practicability of the telephone with which all the great trunk lines have been equipped within the past few years, will be given a thorough trial in the present big strike of telegraph operators on the Great Northern and the Northern Pacific railroads. It is stated that at present the officials of these roads are depending entirely upon the use of telephone to operate their trains.

The strikers are still firm in saying that they have the company beaten, and that it is only a matter of time until the company will give in. The company, however, says that the opposite is the truth, as all the trains are being run on schedule time and no trouble is being experienced.

The railroad telephone is used on the Santa Fe Central system and also on the Southern Pacific, and for ordinary purposes it has proved to be a great success.

Exchange and Underground Construction

D. R. CRAIG

THE rural telephone exchange and lines are a much larger factor in the ultimate success of small city exchanges than the average telephone man has stopped to consider. I make this assertion, because, as a rule, the small city exchanges control the rural lines adjacent to the home office, but the average manager looks on them with little concern. While at the present state of development the rural system is far from being up to the newest idea in modern telephony, yet its importance is of the highest order. While not generally recognized as such, it must be conceded that it is the real key to the success of the city exchange, inasmuch as it puts the business man in direct connection with the consumer, which fact fortifies the position of the home company and makes it impregnable, unless your competitor likewise has rural lines coming into his exchange, and this condition seldom exists, for if you will show me the man who went out with a whole heart when he started his home exchange and gave the patrons of rural lines a reasonable service for a like consideration, he still enjoys their confidence. And why not? Was he in the telephone business for twenty years and then turned a deaf ear to all solicitations from small cities and rural telephone service? No! He is a man who went to his associates and said that he could not give them something for nothing, but would give them telephone service at a price that practically placed it within the reach of everyone. And to-day he is reaping his reward, while the fellow who was in business for twenty years is looking on with consternation at his success and wondering why the people do not like him.

The rural switchboard and party lines are a hard proposition to handle, and nothing but a bridging system should be recognized in this work. The average country line has from ten to twelve telephones, and in a great many cases, from eighteen to twenty, which we are all ready to admit are entirely too many. This alone makes the line very susceptible to trouble, especially during the storm period, and care should be taken in the installation of this work. Your leading-in wire should be a good grade of No. 18 copper and thoroughly soldered to the line and ground connection. Much poor work is done along this line, from which much trouble arises, which is hard to locate, especially if the ground wire connection has been banked over with earth, as is often the case. Of course, this refers to the ground system, which is still quite generally used in our part of the country, and, with the exception of cross-talk, is giving very satisfactory service. We have all our telephones protected with a good carbon or plate arrester, and a baby knife switch in series, with the line between the arrester and telephone, and during a storm this makes your telephone absolutely safe from lightning. This also applies to metallic lines. The only trouble with this protection is, that once in a while a subscriber will forget to throw the switch and, of course, cannot be called. But they soon become educated, and little trouble arises from this. Nothing but the best grade of telephone should be used for this work, and I believe one of 1,600 ohms is preferable, and country telephones should be standardized as much as possible, for many reasons, the cost of maintenance in particular. Where you have so many makes of telephones in use, it necessitates a larger outlay in repair supplies, and the continual inconvenience of carrying so many different kinds of repair material, while driving over the country inspecting telephones.

The inspecting tour is another feature which is sadly neglected by the average exchange, but when this idea is carried out, it saves many a dollar in the "maintenance account." We adopted this system three years ago, and find results very gratifying. We aim to go to every telephone on our lines early in the spring and late in the fall, give them a general trimming up, and put in new batteries when needed. This idea may look extravagant to some; but you will find that it will save many a long ride to fix some individual telephone, when this same expense would have fixed every telephone on the line, and probably saved the trouble in this one, had it been inspected. And not only this, but how much better your subscriber feels, when he knows you are looking after his interests and trying to give him good service, instead of him sending in for you, and being without service for a day or so.

The selection of a switchboard for a rural exchange is a difficult matter, and as far as I have been able to learn, there is no manufacturer who puts out a standard board for this class of work. There are several types of boards intended for this, but they fall short of the requirements for good service. A great many use an express drop, but this is not reliable when central's call must be distinguished from many others on the same line. There are also a good many boards with bells and ringers in use, but when there are a large number of party lines coming into your exchange, they are very confusing and the noise is distracting. After trying nearly all styles of boards and not meeting with success, we had a board made to our own liking and which is giving us good satisfaction. It is arranged with 1,600 ohm ringers, used in the form of buzzers, and rings loud enough to be heard in any part of the operating room, giving a good, clear signal. The board is also arranged with low wound clearing out drops, which will make a louder noise than the average drop, and is adjusted to make a sound different from that of the buzzers, so the operators cannot mistake a ring-off signal.

In rural line construction, the same as in any other class of telephone work, it pays to use the best class of building material that it is possible to get. We are rebuilding our system this year, and putting in a good grade of white cedar poles, twenty and twenty-five feet, six-inch top, Washington fir cross-arms, locust pins and galvanized bolts and braces, which will make a line that will stand for a good many years, with little outlay for maintenance. We use No. 12 B. B. wire, and think that it should be used at all times in preference to a smaller size, as its breaking strain is more and it makes less trouble. Our light leads run thirty poles to the mile, and the toll lines thirty-six.

I have always been a strong advocate of heavy guying, for it saves much trouble and expense, especially in sleet storms, and where leads are very heavy. Let a corner pole get loose, and try as you may, you can never get your lines back in shape, until you cut loose and re-pull them.

In summing up the whole situation, you will find that the rural telephone system is a branch of the telephone business distinctly by itself, for many reasons, and one might go on indefinitely in figuring out needed reforms and the effect of the lock-out system, if present prices would justify exclusive metallic circuits, etc. And in conclusion I will say, the rural field is not receiving the attention it deserves, for it is really the cornerstone on which you have built your success.

Paper read before the convention of the Central Illinois Telephone Association at Peoria.

Modern Telephony: Theory and Practice

W. H. RADCLIFFE

CHAPTER VIII.

THE EXCHANGE AND ITS EQUIPMENT.

THE first problem to be considered in the installation of a telephone system is the location of the central office, or exchange. This matter being one of importance in the operation of the system must receive due attention. The exchange should be centrally located in the district it is intended to supply; it should preferably be placed on the best corner of the most quiet street, as far distant from street railway lines as possible.

In Fig. 22, *a* represents the exchange of one district and *c* the exchange of another district. At *m* and *n*, respectively, are shown two of the main cables leading from the exchanges *a* and *c* into portions of the outlying districts. At the points *r*, *s*, *v*, etc., in each case, a certain number of conductors in cable form, as shown at *r'*, *s'*, *v'*, etc., branch out from the main cables and run to various cable heads, *l*, *t*, etc. Open wire lines connect the individual circuits from the cable heads to the subscribers' instruments, as previously explained, so that each subscriber is connected to the exchange of his district by a separate circuit, called a local circuit, terminating at a switchboard in the exchange. In the exchange *a* the switchboard is denoted by *e*, and in the exchange *c* by *i*. If, therefore, any subscriber in one district desires to communicate with another subscriber in the same district, their local circuits would be connected together at the switchboard in the exchange central to that district.

It very frequently happens, however, that a subscriber in one district wishes to converse with a subscriber in another district, so that some means must be provided for completing their local circuits, which terminate, as just stated, at the switchboards in their respective exchanges. Running between the exchanges *a* and *c*, Fig. 22, are two lines, *b* and *d*, each of which comprises a complete circuit called a trunk line. If the local circuits of the two subscribers be now connected, one to each end of a trunk line, telephonic communication may be carried on between these two parties in different districts. Two trunk lines between adjacent exchanges are usually provided as shown, one for use in answering calls arising in the one district, the other for use in answering calls arising in the other district. At the exchanges the one is called an outgoing trunk line, since it is used entirely for transmitted calls, and the other an incoming trunk line, as it is used entirely for received calls; the outgoing line at one exchange is, therefore, the incoming line at the other. Between small exchanges a single trunk line is used both for outgoing and incoming business; it is then called a common trunk line.

Devoting our attention now to the equipment of the exchange we will commence at that point where the overhead or underground lines, whichever they may be, enter the building. In each wire of every circuit a three-ampere inclosed fuse will first be found; this fuse is intended to protect the apparatus in the exchange from heavy currents of electric light or power circuits, which currents might be brought in on the telephone wires by accidental contact with the conductors of said circuits. After passing these fuses the wires are led to a piece of apparatus, called the main distributing board, on which are usually mounted heat coils and carbon plate arresters. The former serve as a protection from weak but steady foreign currents, which are known as sneak currents for the reason that they sneak past the protective fuses, and the latter as a safeguard against lightning. The actions of these protective devices may be learned from Fig. 23, in which a sectional top view of each is shown. The local line circuit enters the heat coil through a brass spring *a*, and following the lighter brass spring *e* passes through the piston *v*, to which is soldered one end of a metal cylinder *s*. The circuit then continues from the piston and cylinder through a coil of german silver wire *r*, of from five to fifty ohms in resistance, which is soldered at one end to *s* and at the other end to a brass cap *o*; the cap *o* covers the fiber cylinder *b*, and also makes contact with a brass spring *d* through which the circuit leaves the apparatus. A sneak current sufficiently high to damage the apparatus of the exchange would, in traversing this circuit, cause the coil *r* to develop sufficient heat to melt the solder holding *s* to *v*, and the tension under which

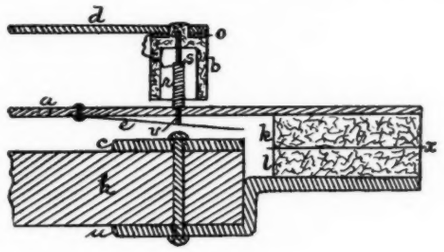


FIG. 22.

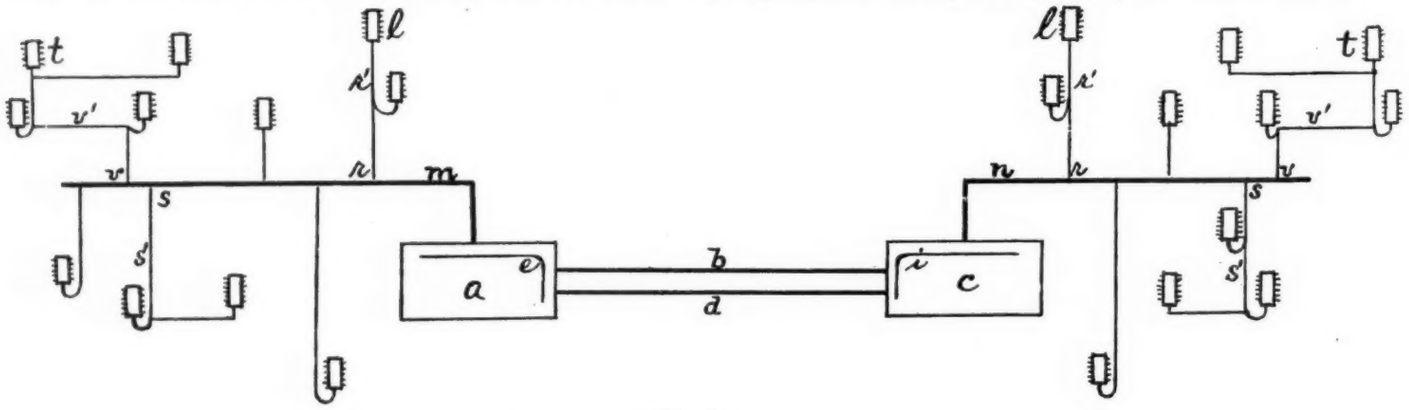


FIG. 23.

NOTE.—This article is a continuation of the series which has been running in The Telephone Magazine.

the spring *d* is normally held being exerted upon the fiber cylinder, the piston *v* will then cause the latter to slip through the metal cylinder *s*, since *s* is prevented from moving by being in contact with *a*. The pressure of the piston *v* will in turn cause the spring *e* to come in contact with an iron bar *c*, from which the sneak current will pass through a steel bar *h* to a second iron bar *u*, and the latter having a ground connection will carry the current to earth and thus prevent it from doing damage.

The carbon blocks, *k* and *l*, separated by a strip of mica *x* and supported between *a* and *u*, constitute the carbon plate arrester. The mica has its central portion cut out so that an air space exists between the carbon blocks equal to the thickness of the mica, generally .008 inch; the normal telephone currents cannot jump this space, but a lightning discharge will find no difficulty in bridging it and through the grounded bar *u* will at once be conducted to earth. Each wire of every telephone circuit being thus provided with a heat coil and carbon plate arrester, there is little chance of the delicate apparatus in the exchange, hereafter to be described, being seriously injured by foreign currents.

In order to facilitate any desired distribution of the subscribers' circuits after entering the exchange and being protected, as previously described, the various wires in the multiple system are next led to the intermediate distributing board which, as its name implies, is intermediate or between the main distributing board, just mentioned, and the operators' switchboard, previously denoted by *e* or *i* in Fig. 22. This piece of apparatus consists of an iron frame so arranged that all the wires from the main distributing board terminate at connectors on one side, and the conductors from the operators' switchboard end at connectors on the other side. These two sets of connectors are joined by flexible wires called jumpers, and a convenient means is thus afforded at any time to shift a given subscriber's circuit to a desired section of the operators' switchboard without distributing the wiring either at the main distributing board or at the switchboard.

The case frequently occurs in which a subscriber changes his address, and must in consequence be wired to the exchange over an entirely different circuit. The advantage gained by retaining his former number at the switchboard is evident, and this is readily accomplished on the intermediate distributing board by changing the jumpers so that they connect the new circuit from the main distributing board with his original switchboard circuit. As the intermediate distributing board carries no protective devices whatever, it is usually about two-thirds the size of the main distributing board.

The operators' switchboard must be so equipped that it provides a means for receiving subscribers' signals, for signaling the subscribers, for connecting their circuits together so that conversation may be established between them, and for disconnecting their circuits when the conversation is completed. To accomplish these results there are on the market two distinctive classes of switchboards, known, respectively, as the transfer switchboard and the multiple switchboard.

In the transfer switchboard there is but one pair of terminals mounted on the face of the board for each subscriber's line, and each operator who desires connection with a subscriber's circuit whose terminals are not within her reach, must transfer the message to the operator before whom these terminals are located. The transfer is accomplished by the use of a subsidiary circuit, called a stripping trunk line, which can be made to connect the proper terminals on different parts of the switchboard. In the multiple switchboard, the terminals of each subscriber's line are repeated or multipled a sufficient number of times that a pair of these terminals are within easy reach of each operator stationed at the board.

BLIND TELEPHONE OPERATOR.

To the average person it would seem as though operating a telephone switchboard would be about the last job on earth at which a blind person could make a success. But at Erie, Illinois, Kirk Thompson, who has not seen the light of day for the past twelve years, may be found daily answering calls at the office of the Crescent Mutual Telephone company, of which he is the local exchange manager. Subscribers to the Crescent service, as well as managers of other lines having connection with the Erie system, say that Mr. Thompson makes one of the best operators they have ever known. He has a remarkably clear voice, and answers calls with more promptness than most operators who have good eyes, and it is exceedingly seldom that he makes an error. He has had charge of the switchboard at that place for the past four years, and the patrons have never been forced to complain of the service they have received.

The switchboard which Mr. Thompson operates is equipped with bells for party lines the same as are still used in many exchanges. On the single lines the drop system is used, and the drops are connected with "buzzer." When a call comes, the operator raises his left hand and passes his fingers rapidly over the shutters until he locates the one which is open. The drops are marked with the Braille system of raised dots, so that he knows at once the number of the telephone calling. It would seem as though this would require considerable time, but Mr. Thompson answers the call and gives the desired connection so quickly that the person calling would not dream that the operator was blind did he not know it.

Mr. Thompson has been blind for the past twelve years. Twenty years ago he received an accidental gunshot wound in his left eye. This soon destroyed the sight of that member, and shortly afterward he noticed that the sight of the remaining eye was badly affected. His sight continued to grow dim until eight years after the accident occurred, he was totally blind. With the coming of the misfortune he set out to adapt himself to make a manly fight in the battle of life under such discouraging conditions. He spent three years at the Illinois School for the Blind at Jacksonville, where he made a special study of piano tuning. He also studied typewriting, and is an expert on the machines, using both the standard and Braille systems.

LAYS TELEPHONITIS TO WOMEN.

"Women are as much responsible for the spread of telephonitis as men," remarked a critical Cleveland man, the other day. "Every place you go you see evidence of this. All of the first-class restaurants and tea rooms now have telephones, and it is no uncommon sight to see a couple of women sitting chatting quietly through a telephone while they munch their club sandwiches and chocolate eclairs. It is hard to tell whether they are discussing business or domestic affairs over the telephone, but at any rate the proprietors of these places seem to think they cannot do business without the telephones. These little instruments are carried from table to table, at the will of the women, and are used repeatedly during the luncheon hour. All the club women have private telephones, many of them on stands besides their beds, and there is not a shop or a club in town that is not the scene of busy activity and eloquence around the telephone booths."

The new law in Indiana regulating telephone companies makes it imperatively necessary for these companies doing business in the territory to file a report of their lines. There is a penalty for non-compliance that runs from $500 to $5,000.

Special Information by Telephone

SAMUEL G. McMEEN

EVERYONE who has spent much time in a small city knows what happens when the fire bell rings and the fire department goes to the scene of action. In addition to the social activity displayed by those who are free to follow, there is an immediate development of an intense curiosity on the part of all to know the exact location of the fire, and this is the more intense on the part of those who have property and other interests likely to be affected.

In every small city where the existence of a fire is made known by any sort of signals struck on a tower bell, the telephone exchange is besieged by queries as to where the fire may be. If the accident occurs during the business day, it is usual for the number of calls, within a few minutes after the sounding of the alarm, to be such as are absolutely incapable of being cared for by any manual or automatic switchboard, which has been invented, or at least which has been installed in the world up to this time.

In a careful count of calls in an exchange of 600 subscribers, an alarm of fire caused the setting of over 85 per cent of all the line signals in the office, and it is to be presumed that only a very small part of these were for other than fire location. All managers of small exchanges —and by this is meant all under two or three thousand subscribers—are familiar with the congestion which occurs, and it is believed that all will agree that it is wholly impossible to give the information to all calling subscribers by the usual expedient of plugging in, answering the call, and giving the proper answer.

There is no difficulty which good management will not remove in the matter of getting the information to the operators quickly enough to enable them to distribute it. The unsurmountable thing so far has been that it is out of the question for operators to answer the calls fast enough to prevent waiting and much annoyance on the part of those who are calling.

A number of efforts have been made to meet this condition, one of which was practiced for several years, and

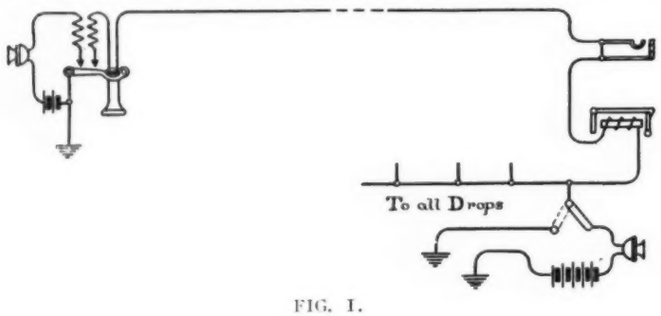


FIG. 1.

required that the chief operator, or some other one person in the central office, should be given the location of the fire, which she would then begin to repeat into the transmitter over and over, saying, "The fire is at Fifth and Main streets—The fire is at Fifth and Main streets—The fire is at Fifth and Main streets." The circuit of her telephone set was carried in multiple to all the positions of the switchboard, being in multiple to at least two plugs at each position. On the appearance of a great influx of calls immediately following the fire alarm, it was the duty of each operator to stop giving regular commercial service, and merely to plug into calling lines with the special plugs, leaving them plugged in only for a few seconds each, then transferring them to other lines. It was expected that in the short time the plug remained in the jack the calling subscriber would hear the information at least once repeated.

In this plan it will be observed that the fundamental feature was that it contemplated a total abandonment of regular exchange service during the time of the special rush for information. A casual observer, unfamiliar with the telephone business, would probably see at once that this is an almost fatal objection, because at the time of a fire the normal use of the telephone is immensely more valuable than this special use, mainly adopted to satisfy

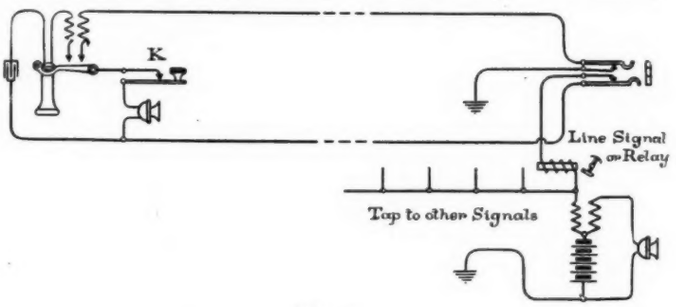


FIG. 2.

the curious. But when it is remembered that as long as the public inflicts such a mass of calls, and there is an almost total paralysis of commercial service, it will be seen that whether or not the whole office shall be given up to disseminating fire locations, any special business, such as calls from the fire chief to a branch of the department, will probably fail to be handled. One can imagine the annoyance and disgust of such an official of the fire department on calling the central office to secure more engines and hose reels, to be told in an exasperating monotone that "The fire is at Fifth and Main streets." This would likely be all the more maddening because of the fact that he is there himself.

A few weeks ago a telephone company operating in one of the western states announced that it would probably find it necessary to refuse to give fire location information, in the hope that by such a refusal it might wholly or partially discourage the practice of calling on the central office for the facts, and thus enable it at such a critical time to more nearly perform its usual and important function.

The result of this announcement was to arouse the wrath of the neighborhood, and a newspaper in a neighboring city is said to have commented that the offending company "should not forget that there is room for one more telephone system in any town." In such a condition it is easy to imagine the management wondering which horn of the dilemma is the worse.

It has long been considered possible to meet this condition by means of apparatus, and in a few instances installations of such apparatus have been successfully utilized. The first to be so applied was in connection with a board serving grounded circuits only, and was abandoned only because of the conversion of the system into one utilizing metallic circuit throughout, and into which the plan did not fit.

The original arrangement referred to was one in which the fire location information was given to the chief oper-

NOTE.—An error was made in presenting the wrong diagrams in Mr. McMeen's article last month. We reprint it in this issue with the proper diagrams.

ator, and by her monotonously repeated into a transmitter, connected as shown in Fig. 1 in series with a battery and the common office ground. A little thought will show that this battery and transmitter are in series with a path common to all the lines in the town under normal conditions, and that the only lines not sharing that path are those connected together by switchboard cords. This is exactly the condition required, because the method of operation called upon subscribers to remove the receiver from the hook and listen for the fire location without signaling the central office by turning the crank of the magneto bell.

Those who are familiar with the extreme amount of division which may take place in voice currents, and still leave them not only audible, but intelligible, will appreciate that the number of subscribers' lines which may be served in this way will be very large, even though there is some division of current even through stations at which no one is listening. The results will be better for the given number of stations, or possible at the same volume for a larger number of stations, where all are equipped with bells with high resistance ringers.

In the case of the first experiment there were 900 lines, and upon these perfectly accurate fire locations were given for many months.

An incidental proof of the effectiveness of the system lay in the experience gained in distributing election bulletins. These were given on the same transmitter as was provided for fire locations, and with such accuracy that a newspaper which had been calling at intervals for special bulletins from the rural districts, stopped doing so and kept a man at the telephone continuously taking down the routine information given by the one bulletin reader at the fire location transmitter. Many of the substations in this equipment had bells with 80 ohm ringers.

The application of this scheme to common battery systems is less convenient than to magneto systems because of the fact that a call is placed by the mere removal of the receiver from the hook, and listening is not usually possible otherwise. Several methods suggest themselves, however, one of which is illustrated in Fig. 2, in which the central office is called the same as in the original arrangement, but in which the subscriber must perform a special act to defeat setting the signal. This act is to press the key *K*, opening his transmitter circuit, and preventing a call upon the line.

It is obvious that any arrangement which will leave the receiver in series with a condenser across the line will enable the subscriber to hear without calling the central office. Any substation set containing a condenser may be so arranged without difficulty. Similarly, any central office circuit involving the use of a cut-off relay instead of a cut-off jack, may be arranged to furnish the special information through the line relay or line signal, this information being stopped by the act of answering, and real conversation between subscribers being free from the annoyance of undesired information.

The transmitter at the central office and of the circuit is that which spreads the special information, and if of a type capable of carrying a good volume of current without burning, will give surprising results.

PUTTING IN THE TELEPHONE.

"James," said Mrs. Shumaker, "the telephone men have come to see about putting in the telephone."

"Very well," said Shumaker, with that exasperating indifference to domestic crises that has driven many a woman to an early grave. And he returned to his newspaper.

"But where shall we have it put?"

"Any old place, my dear."

"But James," said Mrs. Shumaker, with an intonation that her husband knew, "I have asked you for days where to have that telephone put and it isn't decided yet."

"Well, isn't that just a little your fault, my dear?" asked Shumaker. "Every time you have asked me I have said that it should be put in the rear of the hall. That spot really does, in spite of constant and unexplained objection, appeal to me as the very place where it might best hang to suit your convenience—everybody's convenience."

Mrs. Shumaker sniffed contemptuously. "What if burglars were to come? How could we possibly get down there in the night? One of the chief things for having the thing put in is for burglar protection. Suppose a fire started in the cellar and our escape from upstairs was cut off, how could we get down stairs to summon the fire department?"

"Well," said Shumaker, wearily, "if you prefer upstairs, for goodness sake have it placed upstairs, and let the matter drop. The thing is for your convenience, and if you feel it is for your convenience to trot up a flight of stairs whenever the telephone bell tinkles, far be it from me to suggest the rear of the down stairs hall again."

"Of course," said Mrs. Shumaker, thoughtfully, "I would have to run upstairs every time the bell rang if I have it put upstairs, and that might grow tiresome. But, then, it ought to be there if burglars ever——"

"My dear," said Shumaker, "we have been keeping house about fifteen years now, haven't we?"

"Yes," said Mrs. Shumaker, with some doubt in her voice—doubt of his ultimate purpose in asking the question.

"And in all that time has anyone ever rattled our front door knob even with a view of getting in unless that person had a legitimate right——"

"Nonsense!" said Mrs. Shumaker. "They may get in to-night and take everything we've managed to accumulate during these years you speak of. Well, if upstairs won't do, why don't you suggest somewhere else?"

"That's easy. I suggest the rear of the downstairs hall."

"James, I shall scream if you continue to talk about that perfectly impossible place. Why will you be so provoking?"

"I have no other place to suggest. I am willing, even anxious, that you should suit yourself about it, anyway."

"But you won't help me a bit!"

"Now, you just choose a spot yourself and hang that blamed thing on it for ornament or use, just as you decide. Consider the roof, the bathtub, under the kitchen sink——"

"James, you are perfectly useless. I had to work like a mad woman to get you to consent to have that modern convenience here and I have all the trouble of getting it placed, and when I come to you for help all you say is 'rear of the hall.'"

Shumaker whistled softly. "Because you asked me the best place as I view the situation and I tell you what I consider the best place. Here comes the telephone man. Now let him settle the matter for you, and then in the future you blame him if things don't suit you."

Shumaker was still whistling softly when his wife asked and the man answered the crucial question. But he stopped in time to hear his wife's reply.

"Certainly," she said, "that's what we have decided on. It would be hidden by the stairs, and it would be very inconvenient to have it upstairs. In the rear of the hall, then."

Shumaker began to whistle again, softly and slowly, but meeting his wife's steely eye, he got up quietly and started down town.—Chicago News.

The telephone and rural free delivery of mail have increased Georgia farm lands from ten dollars to one hundred dollars an acre.

The Benefits of Telephone Publicity

VINTON A. SEARS

THE three main objects of the National-Interstate Telephone Association, as suggested in Theodore Gary's recent statement, seem to hit the nail on the head, and I believe that, if these three objects can be thoroughly organized and completely carried out, great benefit will accrue to all the members. "To gather information and statistics of the Independent telephone business is the first main object. Says Mr. Gary, "This will enable a story to be told in facts and figures that the greatest development made by any industry in the world is the Independent telephone movement."

I wish to comment upon this particular object, which is, perhaps, the most important at this time; it has been neglected in the past, but in the future it can undoubtedly be made one of the greatest helps to the Independent telephone business. If the Association is to receive the hearty moral and financial support of the many thousands of companies, it must return them direct benefit, of value to their daily business. Almost every one of the companies can be materially benefited by the inauguration and carrying out of a telephone publicity department. The telephone story can be so well and truly told that it will carry conviction throughout the land. Its form should be attractive to the disinterested, so as to awaken new interests.

Every statement and table of statistics should be authenticated beyond the question of a doubt. The actual condition of this business is good enough without overestimating any part of it. Conservatism in this respect might be advantageous. The future holds attractive prospects and the realization of such progress as will certainly be made will surely command the increasing interest of investors, if given the light of publicity from time to time.

It must be admitted that the opposition, or telephone trust, has a fundamental advantage in that it has been able to secure its new capital at a cost of four and one-half to five per cent per annum, while many of the large Independent plants have been financed upon a basis that cost ten to twelve per cent per annum upon the capital employed, in order to take care of their bonds and pay a dividend upon their stock, which dividend seems to be necessary to prove that the company "makes good," although, perhaps, the stock represents no cash investment. That the average company can make good with such handicaps is the best proof of a healthy and profitable business.

This high cost of capital is a serious matter and, while it is gradually improving from natural causes, yet something should be done to more forcibly prove to bankers and investors that the telephone business is stable and profitable enough to warrant the investment of capital at no more than the ordinary rates of interest (there being a safeguard in excess earnings).

This business is, and can continue to be, highly profitable as compared with other lines, and it can earn a great deal more than the ordinary interest on capital, but surplus earnings should insure: First, the stability of the investment; second, provide for the most efficient management and employes; third, leave a reasonable profit for legitimate promotion. In other words, telephone securities should be sold at a reasonable cash price, as compared with other public service corporation securities. That they have not yet become so favorably known in the money centers of the country is due to the lack of telephone publicity. A proper and complete compilation of facts and figures from time to time and, if possible, with some degree of regularity, would convince capitalists and bankers that telephony compares most favorably with any other kind of public service.

The Association might and, in my opinion, should, create a well-equipped department for compiling information and statistics in proper and get-at-able form, for the use and encouragement of its members. An attractive pamphlet might be issued once in three months, showing the highest development in various parts of the country, including some shining examples of success for the encouragement of the weary worker, and a number of comparative tables of growth, progress, dividends, etc., covering all phases of the business. There would be little, if any, difficulty in securing regular reports from the principal telephone companies, together with other appropriate statements of the business, such as would enable this quarterly report to contain the most absolute evidence and up-to-date proof of the progress and success of this business. One of the strongest cards the telephone trust has to play is its monthly statement of increased output of telephones. Stockholders, bankers and investors read these reports (for they never fail to appear in all the financial papers) and continue to feel secure in their faith that the Bell system monopolizes the field, unless, perchance, they see actual evidence of competition, and then they are apt to think it exists only in their locality.

Statements and statistics should be so made as to compel belief among the incredulous, not simply to meet the approval of the Independent telephone man, who knows a lot of things that he cannot prove. The various estimates of the Independent telephone business lack uniformity, which of itself casts doubt upon all estimates.

A quarterly record of attractively arranged facts, showing the best of everything, but nothing overdrawn, would furnish first-class material for the use of all classes of telephone workers. A new company should find in it sufficient evidence to convince any honest city council of the desirability of competition and to show that a community cannot expect the best service at a reasonable cost in any other way. We all know of the long-drawn-out controversies that have occurred in nearly all of the larger cities where franchises have been asked for during the last few years. The telephone trust sends its operators to tell the city governments, and as much of the public as will listen, that competition is always undesirable; that Independent companies everywhere fail; that the trust is the only concern that can give good service, and that its rates are very reasonable. The trust always buys much space in the newspapers in its attempt to influence public opinion in its favor. The Independent company does not often have its forces properly organized, or its facts in good form, or backed with sufficient proof to carry absolute conviction.

You have all recognized the necessity for a national telephone publicity department, and you would all probably support it, provided it can be created and maintained in a businesslike way. It is a simple thing, and yet one not without difficulties. But if it had no difficulties, it could be carried on by anyone and there would be no necessity for the Association to take it up, nor credit in making it successful.

The Independent telephone business has to-day reached a stage of development that will permit its taking great forward strides in the next few years, and these strides should be actually chronicled.

Paper prepared for the National-Interstate Convention, at Chicago.

Decisions Affecting Telephony

G. W. HAND

ELECTRIC WIRE FOUND DANGLING ACROSS A STREET SOME EVIDENCE OF NEGLIGENCE.

THE above declaration of the law was made in a Massachusetts case by Justice Hoar and will be found more fully set forth in another decision by the same court more recently decided. "The fact that a telegraph wire is found swinging across a public way at such a height as to obstruct and endanger ordinary travel is, in itself, unexplained and unaccounted for, some evidence of neglect on the part of the company whose duty it is to keep it in a safe and proper position, and the question of negligence should be submitted to the jury." In the case last referred to a wire had in some manner become broken and was found dangling in a street. Evidence was introduced to the effect that notice of this was conveyed by telephone to the manager of the company, which he denied he ever received. The evidence also disclosed the fact that the wire had been run through a tree and, as someone testified, in an unsatisfactory way. One Linton, an onlooker, was warned by a deputy sheriff who stood near by to desist from poking the wire with an umbrella which Linton carried, and the latter thereupon moved on, but later returned and in some manner was injured by the current of electricity. He testified that the loop was blown by the wind against his person, but the company contended that his injury was occasioned by his own negligence in playing with the wire. On all these facts the case was submitted to the jury and a verdict was returned in favor of the company.

This case furnishes a good instance for a statement of the law regarding the circumstances when a court will decide questions of negligence and when the court will insist that the jury decide them. In the above case two theories were advanced of plaintiff's contributory negligence—one by the company, that he was meddling with the wire when injured, the other by the plaintiff himself, which, if true, would have relieved plaintiff of all contributory negligence that the wire was blown against him by the wind. Plainly these claims were inconsistent and raised a question of fact, which is always for the jury to decide. On the other hand a court will decide questions of negligence as a matter of law if the facts regarding the action of all parties interested are undisputed, and the question arises whether, as a result of the given state of facts, negligence must have existed. This reasoning grows out of the theory that if there is but one conclusion to draw from admitted facts the court can decide the matter as accurately as twelve men. When the facts are disputed the jury must pass upon them; when undisputed and only one conclusion can be drawn from them, the court will decide questions of negligence.

Linton v. Weymouth Light & Power Company, 74 N. E. 321.

REGULATION OF RATES OF PUBLIC SERVICE CORPORATIONS BY MUNICIPALITIES.

It will be recalled that in a recent issue of TELEPHONY this question was discussed, and many of the important cases, bearing on the general rule on the subject, cited. The rule of law, as stated in the above discussion, was recently very clearly stated by Judge Brooke of the Detroit circuit court in an important gas rate case in which the city of Detroit is seeking to interfere with the rates of the Detroit Gas Company. He said in part: "The right to fix or regulate prices which may be charged by public service corporations is a governmental one and cannot be exercised by a municipality, unless there is a clear and unambiguous grant to that end from the sovereign authority, that is, the state." This statement of the law in Michigan on this subject, coming from one of the leading jurists of Detroit, is worthy of much consideration. As applied to telephone companies it is the law that no municipality has authority to interfere with the rates of service that any company may decide to charge, unless there is a plain grant of authority to regulate such matters in the charter, from the legislative authority of the state.

ERECTING POLES ON THE LANDS OF ANOTHER WITHOUT AUTHORITY.

The Kentucky Court of Appeals recently held, in a case involving the right of a company to maintain its poles on the lands of one upon which they had been placed without authority, that the owner was entitled to have an order requiring the company to remove the poles erected under such conditions.

Purdam v. Cumberland Telephone & Telegraph Company, 87 S. W. 1071.

ERECTING POLES ON LANDS OF TENANTS IN COMMON UNDER WRITTEN PERMIT OF ONE OF THE CO-TENANTS.

The South Carolina courts recently passed on this question in a case where two tenants in common, Lucinda Mason and Lizzie Mason, the owners of certain real estate on whose lands the Postal Telegraph Cable Company had erected a line of telegraph, sought to hold the company liable for damages for wilful trespass thereon. The company in defense presented a written permit, signed by the second of the above parties, in which, for a consideration of two dollars, she consented to the erection of the poles on the lands in question. The Supreme court of the state, in deciding the case and after referring to the case of Frances Granger v. Postal Telegraph Cable Company, 50 S. E. 193, which the court stated was a ruling case on this subject, said:

"There is no foundation for an action of trespass, by reason of the construction and maintenance of telegraph lines, when one tenant in common of property has granted permit or license so to do, unless defendant has committed a trespass by doing something not properly incident to the exercise of the right granted, or by injuriously exercising the right in a negligent or wanton manner. . . . Defendant having entered for the construction of its lines by the permission of the plaintiff—express so far as Lizzie Mason is concerned and implied so far as Lucinda Mason is concerned—is not a trespasser and is not liable as such under the circumstances stated."

Mason et al v. Postal Telegraph Cable Company, 50 S. E. 782.

INJURY TO LINEMAN—DEFECTIVE CONSTRUCTION DISCLOSED BY EFFECT OF STORM—LIABILITY UNDER SUCH CIRCUMSTANCES.

The highest court of Missouri recently held in a case where an electric lineman was injured by the alleged negligence of a telephone company in setting a guy wire, that the company was not relieved from liability because of the fact that the defectiveness of the construction only manifested itself after a severe but not unprecedented storm, on the theory that the defendant was bound to make its con-

struction sufficient to withstand storms of ordinary or normal severity.

"It is not enough to exonerate it from blame to show that the guy pole, as it stood, was a safe construction in fair weather. Severe storms are a normal condition, and any construction is not reasonably safe, and cannot be denominated the result of proper care, that will not withstand them." The defense on the part of the company that the storm was the producing cause of the accident over which the suit arose was accordingly overruled.

Smith v. Missouri & Kansas Telephone Company, 87 S. W. 71.

EMPLOYE BECAME FRIGHTENED, RAN FROM STATION AND WAS INJURED—CONTRIBUTORY NEGLIGENCE—FELLOW SERVANT RULE IN WASHINGTON.

In a personal injury case in the above state the facts were that a number of linemen were engaged in lowering a line of poles and for this purpose were using the ordinary appliances, such as pikes and dead-men, to facilitate the work. The plaintiff in the suit was handling one of the dead-men and had placed the bottom of it on the ground, and the pole had been lowered into the crotch at the top, when, on account of the slanting ground, the base of the dead-man slipped, thereby lowering the telephone pole much more than was expected. Becoming frightened he let go of the dead-man and started to run, and, as a result of his fright, ran directly under the falling pole and was injured. The above statement of facts will render clear the rule of law on the question of the injured man's contributory negligence, stated by the Supreme court of Washington:

"Was the respondent guilty of contributory negligence? It is not sufficient to say, or to show, that he would have received no injury had he remained by his dead-man. He was placed in a dangerous position through what the jury had a right to find was negligence on the part of the appellant. A telephone pole weighing some six or seven hundred pounds was suspended in midair above him, beyond the control of the pikeman. He knew it would fall, but had not the time to consider when or where. On the impulse of the moment he took what seemed to him the safest course, though he may have erred in his judgment. His position was similar to one who jumps from a moving train to avoid a collision which seems imminent. The question of his contributory negligence was for the jury."

In deciding the case the court was also required to decide the question whether the foreman of the company controlling the gang of linemen was a fellow-servant of the one injured. Under the well-settled rule of law, if he was a fellow-servant then the master was not liable for the result of the orders of the foreman; or differently stated, if he was a fellow-servant of the foreman he had to take the chances of injury resulting from negligence of the foreman. The court said as follows:

"It appears from the testimony that the foreman was selected by the appellant, and was given the entire charge and supervision of the work about which the respondent and the other employes were engaged; and that at the time of the injury the foreman stood at the foot of the pole and gave orders at every step in the process of taking it down. These orders the respondent was bound to obey, and if by them he was led into a place of danger, or if, thereby, his place of work was rendered unsafe, the employer is responsible for an injury occurring because thereof." And further in quoting from a railroad case, 46 Pac. 334: "We think that in reason and upon the authority of the better considered cases, it must be held that it is a positive duty which the master owes to an employe not only to provide him with a reasonably safe place to work, so far as the nature of the work undertaken and the exigencies of the case will permit the same to be made reasonably safe, but also to observe such care as will not expose the employe to perils and dangers which may have been guarded against by reasonable care and diligence; and where the performance of this positive duty is by the master intrusted to another his failure to perform is the failure of the master."

Sandquist v. Independent Telephone Company, 80 Pacific, 539.

DUTY OF COMPANY TO ERECT GUARDS IN CROSSING OVER ELECTRIC LIGHT WIRES—ACCIDENTS DUE TO STORM OF UNUSUAL SEVERITY.

A Georgia case of recent date contains a discussion of the law on these questions. An ordinance, granting a franchise to a telephone company to construct and maintain its lines upon the streets and alleys of the city of Waycross of the above state, provided that wherever it was necessary for the telephone wires to cross any electric light wire, a space of not less than three feet should be left between the former and the latter, and if it was found necessary to raise or lower the wires in order to maintain this distance, that the expense of the work should be borne by the company doing the latest construction. The ordinance also required proper guards to be placed and maintained at such place of crossing. The Supreme court held that this duty of erecting guards fell on the company erecting its wires over the wires of the other.

A telephone wire having become broken by a storm which could not have been anticipated or reasonably foreseen, and having fallen upon an electric light wire charged with a heavy and dangerous current of electricity, which had been grounded by the falling of a tree from the effects of the storm, the liability of the owners of the respective wires depended upon the question whether there was any negligence in the construction and maintenance of the wires, where the injury occurred immediately after the falling of the wires and neither company has a reasonable time to discover and abate the danger.

Heidt v. Southern Telephone & Telegraph Company et al, 50 S. E. 361.

TELEPHONE MANAGER HAS HIS TROUBLES.

A. Von Schlegell, manager of the Northwestern Telephone Company, desires to have a long-suffering public know that he, too, has his troubles, says the Minneapolis Tribune. He avers that he is used to "kicks" of all kinds, can stand them and doesn't mind them, but when it comes to taking fights off the hands of belligerent patrons, he fain would pass.

"A man called me up the other day," said Mr. Von Schlegell, "and told me that that J—— had called him a ——— ———" and then some.

" 'What would you do if you were me?' he says. 'I don't know,' I says; 'why don't you lick him?'

" 'Well,' he says, 'he's a big man and a fighter, and I don't think I'd better try it. What are you going to do about it?'

"I told him I hadn't anything to do with it. Then he said I ought to make J—— take it back.

" 'Not me,' says I; 'you've got the wrong number. Call up Jimmy Potts; he's Minneapolis' representative fighting man at present.'

"Then he abused me until I told him that I heartily indorsed the things J—— had called him, particularly the remarks which dealt with him as a 'four-ply ass.'

"We talked it over quietly after that, and I suggested that he have J—— arrested for using abusive language by wire.

"He said he was afraid J—— would assault him on sight if he did such a thing, and then he put it up to me again. There the matter rests. I think I'll get the janitor to impersonate J—— and offer him an apology."

Increasing Long-Distance Business

M. B. OVERLY

LONG-DISTANCE service is a term that we apply as a rule to all toll service. Any service for which we charge a toll between any two exchanges or toll stations, or an exchange and a toll station, we are pleased to call long-distance service. I think we are all interested in knowing how we can improve this service. I do not know whether it was intended that the question should mean how we can improve the quality of the service, or how we can increase the volume. I think we are interested in both topics, because the increase in the volume of our business depends upon the quality having been increased. Therefore, I will take up first the increasing of the quality of our service. We can do that in several ways. In the first place it is necessary for us to have a sufficient number of toll lines to enable our subscribers to get a point they wish promptly. We have not always been able to do that. Probably we never will be able to furnish the toll line rapidly enough to give what we would call prompt toll service. We get it here and there, and some other places we don't give it quite so promptly, but besides having enough toll lines it is necessary that we should keep those toll lines in absolutely first-class shape; that every line be put in good shape in the first place; that we maintain them in good shape; that every line be kept in good order, and that we anticipate trouble by trimming trees every once in a while, by going over poles, pulling up slack, straightening up corners, and all such things as that.

There is nothing that will interfere so much with our long-distance service as poor maintenance; allowing men to repair lines by putting in hand connections, but where there are hand connections in the fences and such places as that, by soldering them. It is necessary that every connection be soldered unless a sleeve is used. If a sleeve is used and twisted up properly it is not necessary. See to it that the line is quiet. It is not only necessary alone to keep the lines in good shape, but every part of the equipment. If we have the best of wires, we may string No. 8 copper, but if we do not have the subscriber's telephone in good shape, if we do not keep his batteries up, if we do not keep the cords repaired, if we do not keep the signals in good shape, and the toll-board and switchboard also in good shape, so that the operators get the signals promptly, the No. 8 circuits will avail us nothing. There is no benefit in stringing large circuits and lots of them if we do not keep up the equipment. We are to feel what every company in Ohio lacks, to a greater or less extent, and it is for every one of us to see to it that our equipment is kept in good shape.

A short time ago we had a call from a certain party at a certain point for a certain other point, and the calling party complained that it was the worst service he had ever had. He said he had understood that we had strung a number of new circuits; we had spoken about those No. 8 wires, and he thought we could give good service, and he said, "It was actually the worst service that I ever tried to talk over in my life." Of course we investigated, and we found that it was on account of the telephone of the party that he was talking to or attempting to talk to. That was a distance of about 100 miles. He held up a line for probably twenty minutes trying to talk, and the only thing wrong was the batteries on the other end of the line. That comes up every once in a while. Where you have a man who uses a great amount of toll service inspect his instrument oftener. With your large toll user, inspect the batteries every week or ten days. See that the cords on the instrument are in good shape and besides that keep your office equipment up.

Another thing that interferes very largely in this state—and I presume the same is true in other states—with our handling and giving good toll service is the fact that we have never had a system for handling long-distance service. The office at Columbus is handling it on one basis, the office at Wooster on another, and so on, with the result that every office is handling the business in the way that has appealed to it, or the way that it has drifted into. Now it is said that an army is strong only in relation to the amount of training that it has had. You take a body of men that have been well trained and they will put to rout another body of men ten times as great in point of numbers who have not been trained. The same applies to the long-distance service. Have operators trained to handle business along the latest methods, to handle service quicker and better, and more of it.

We got out a book of rules not long ago that was written up by several of us on our own ideas; we took some ideas that we got from the Bell, and we wrote them up and then we re-wrote them and sent them out and got the criticisms of other long-distance companies, and when they got back they didn't look a whole lot like they started out, but I believe they are a pretty fair set of rules. They are made out with the idea of meeting the requirements of the largest possible exchange from the toll standpoint, but the same rules will apply to the smallest exchange, if you simply eliminate the positions that are not held in the smaller exchanges. In a large office there is a chief operator, assistant chief operator, supervisors, monitors, and so on, and in a smaller exchange one person will be all of those things, like the manager of a small exchange, who is general manager, assistant general manager, and all that. Same way with your operators. I think if we would all take these rules and study them and have our chief operator study them and practice them we would be able to increase the efficiency of our long-distance lines a great deal and be able to handle a great deal more business over the long-distance.

A great many things are to be considered. Among them is having the operator handle calls in a businesslike manner, not doing any talking that is not absolutely necessary, not using any words not absolutely necessary to the handling of that call. We find that the operator will ring another office, get the operator at the other end, and she will say, "Hello, deary," or "Hello, honey," and they will pass a few remarks before they will think about sending in the call. We found a case lately where an operator called and made the connection with the other exchange and then let a couple of her friends talk for fifteen or twenty minutes, and then passed the call. It isn't any hardship to say they must not do this: that they must not use our lines for conversation not necessary. It costs money to build toll lines, and there is no reason why the operator should take up time on those lines in useless conversation. It is wasting time for you and wasting the lines for us, with the result that the revenue is much less than it would be otherwise.

Paper read before Ohio Independent Telephone Association at Columbus, Ohio.

Application has been made for a charter in New Haven, Connecticut, by the Citizens' Telephone Company. The company will have a preliminary capitalization of $1,000,000, with the privilege of raising it to $10,000,000.

Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

AND

THE TELEPHONE MAGAZINE

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IMPORTANT MERGER OF TELEPHONE JOURNALS

WITH the present issue TELEPHONY takes on new importance and moves to a still higher place in the field of telephone journalism, the Telephony Publishing Company having purchased The Telephone Magazine, the oldest publication of its class, and merged it with TELEPHONY, making this journal, which always has been the acknowledged leader among telephone papers, stronger than ever and still more valuable as an advertising medium. The circulation, advertising and leading technical articles of these two influential properties have been combined in one noteworthy publication, which will retain the title TELEPHONY and continue to issue in its present form.

This is the most important move of its kind that has ever been made by a publishing house in the history of the movement, and while it would seem to be unnecessary to enumerate all of the advantages and benefits accruing from this merger, yet the occasion appears to require some comment. Every telephone reader and advertiser is more or less familiar with the past achievements of both TELEPHONY and The Telephone Magazine, and will, therefore, readily appreciate how unusually strong and efficient a medium will be created by their combination. The Telephone Magazine, with a record of twenty-six successive volumes, brings to TELEPHONY all of the advantages acquired by long years of earnest, careful and conservative endeavor. So thoroughly has The Telephone Magazine become ingratiated into the favor of the leading telephone men, that we know it will be a pleasure to them to see it become a part of so great a property. By this merger we are able to give reader and advertiser a publication bigger, better and more desirable than any individual journal representing the telephone field could ever hope to become, and we believe that all interests will welcome the consolidation and will give it their universal and unqualified support.

To those who have known TELEPHONY from the first, and have watched its progress—ever since its inception, the greatest, best and most influential factor in its field—we wish to say that it will be made still better and broader, and a more powerful representative of the great Independent telephone interests. Our patrons may rest assured that TELEPHONY will continue to be foremost in all that goes to make a publication good and great. With the combined circulation of TELEPHONY and The Telephone Magazine—already covering practically every important telephone reader in the world—we will send the publication to every new company or individual entering the telephone field, so that, at all times, it will reach everybody interested in the business.

The best of technical contributions, the greatest writers, the finest illustrations, the cream of feature matter and the most complete assortment of departmental and miscellaneous reading will be presented each month, making TELEPHONY the most thoroughly representative medium of which any American industry can boast.

We have in TELEPHONY and its new acquisition an investment which is characteristic of the magnitude and importance of the telephone art. Years of labor and thousands of dollars are represented in this consolidation. Neither pains nor expense has been spared to give both reader and advertiser all that could possibly be desired in the shape of a clean, progressive and attractive publication. The attention of all advertisers who desire to cater to the telephone trade is especially invited to the following conspicuous advantages possessed by the consolidated publication, and enjoyed exclusively by the new and greater TELEPHONY:

(1) It is the largest dollar-a-year trade paper in the world.

(2) It is the oldest and best publication devoted exclusively to the telephone industry.

(3) It is published in the heart of the industry it represents, and is in constant touch with its every branch.

(4) It enjoys by far the largest circulation in its field, this circulation embracing almost every influential telephone reader to be found anywhere.

(5) It publishes a most complete and accurate directory of operating telephone companies, manufacturers, supply dealers, contractors and engineers, embracing both Independent and Bell companies, domestic and foreign.

(6) It issues a daily printed bulletin service, which reports the needs of operating companies as regards supplies; and gives information regarding new corporations, changes of officers, increase in capital, new construction, improvements, etc.

(7) It is issued promptly on the first day of each month and is the recognized authority in telephone circles, for the appearance of which every telephone reader and buyer looks forward with keen anticipation.

(8) It is published by experienced men, who have made telephone journalism their exclusive work for years.

(9) Its superior value as an advertising medium is apparent at a glance, being amply evidenced by its size, general make-up and prosperous appearance.

(10) In a word, it is TELEPHONY—the great national authority on everything pertaining to the telephone industry, and as has been so often declared by our readers, "The telephone man's bible."

We ask that every advertiser consider fully what TELEPHONY and The Telephone Magazine have been, and have done, as regards the telephone industry; that they ponder seriously how exceptionally strong and meritorious a publication this union will create; that they take into consideration the labor and expense incurred to give the telephone field a medium embracing every advantage which could be desired; that they reciprocate, and in helping us, help themselves and the entire Independent movement.

This issue of TELEPHONY, replete with good things and complete in every particular, is a fair sample of what our clientele may expect in the future, except that, with each succeeding month, it will be the endeavor of the publishers and editors to make it brighter, better and more interesting than ever—an absolute authority on all matters pertaining to telephony and a classic in the particular field it so ably and exhaustively covers.

SERVICE AND RATES.

THE Merchants' Association of the city of New York has lately taken occasion to investigate the matter of telephone service and charges, with an ultimate view of bringing about a reduction of rates in case it seemed to be established that the rates charged in that city were excessive. Along certain lines the investigation seems to have been thorough, and the report which has been rendered is one which may be read with interest, and its matter digested with advantage. An interesting phase of it is that in which it is stated, "that consistent and reasonable publicity of the affairs of public service corporations is not only due to the public as its right, but that such publicity would do much to remove prejudice and misconception and to promote the interests both of the public and of those whose capital is invested. No fair-minded person will deny that the capital employed in telephone operation is entitled to a just return. If the public is assured by proper evidence that the capitalization is not inflated, that the operating outlays are not excessive, and that the net profit is reasonable, there will be little complaint, and the fairness of the charges will be generally conceded. When, however, the managers of a public service corporation refuse to the public the knowledge necessary to enable it to judge understandingly and deny the public right to such knowledge, prejudice and misconception must arise, with periodic appeals to the legislature for the correction of what is believed, either rightly or wrongly, to be unjust."

Without particular reference to the telephone history which has been made in New York city, most persons who are old enough to remember the scope of the telephone business prior to the commencement of competition will recall that instances in which rates have been reduced have been rare, and even those which might be found by a close historical analysis, will generally be found to be reductions in name rather than in fact. Likewise, this history contains repeated statements that the cost of telephone service increases as the number of subscribers increases, even in communities in which the area to be covered did not increase at all.

Over against this absence of voluntary reductions before the commencement of competition, are found many efforts, some of them successful, to enforce new rate schedules by legislation, either municipal or state. It is perhaps not too much to say that the effect of every bit of state legislation of this kind was detrimental to the interests of the public. The rates which were established by the legislature of Indiana in 1885 had the result not only of stopping telephone development during the time the law was in effect, but enormously decreased the total number of telephones operating within the state. Many towns with thriving little exchanges had to give them up because the company could not, or would not, operate at the rates the law allowed.

The tendency toward legislative regulation has practically disappeared. Competition has supplied the need, and in a way which is very much more effective, as the results are almost sure to bear a definite relation to the needs, which could hardly be true with other than a very elaborate and highly complicated general law.

The investigation by the Merchants' Association in New York lays down as the opinion of the committee that the fair annual cost of service to the consumer should comprehend annual operating outlays necessary to the highest efficiency, including an ample allowance for replacement, and, added to this, a reasonable return on the actual investment necessary to the fullest efficiency of service, including a fair allowance for contingencies. It has always seemed to us to be true, even to truism, that in the telephone business, as in any other, the price of the service should be its cost, plus a reasonable profit. For some reason, this seemingly simple conclusion does not meet with a hearty welcome in all branches of telephonic activity, and in none, heretofore, less than in the not too liberal management of Bell companies. It is refreshing to see that a group of representative business men turning consideration to the telephone problem should be inclined to condense their acquired wisdom into the two important truths that "price consists of cost plus profit," and that "care must be taken to allow for depreciation charges."

WHAT DOES THE SERVICE COST?

ANY merchant will tell you that he arrives at the price at which he must sell his goods by adding up figures to learn their cost, and then adding a reasonable profit. What is to be considered reasonable in the way of profit he decides by taking into account how much he can get, the volume of his business, and the likelihood of changing styles.

It does not immediately appear how any merchant can determine with exactness the proper selling price for his goods unless he knows their cost.

There seems to be no real difference between the selling of material commodities and the selling of telephone service, and the same logic which determines the price of the one would seem to apply to the other. But there is a notable absence of such digested experience as will enable anyone, even the producer, to say with certainty what is the cost of

telephone service. Many books have been written on the finding and keeping of shop costs, and manufacturers are able not only to determine what their output has cost and is costing, but to predict with much certainty what a proposed new type will cost when tools are made and goods produced.

In some notable efforts to determine what is the cost of giving service, investigations have been made by the engineers with one result, and by the auditors with another. Who shall decide when doctors disagree?

ESTIMATED POPULATION.

A STATEMENT coming from the chief engineer of the New York Telephone Company, concerning the methods of public service corporations in estimating populations of cities, as far as twenty years ahead, deals with the theory of probabilities, as applied to population increase, with as near an approach to accuracy, perhaps, as is possible in solving so uncertain a problem. Telephone companies, it is quite apparent, must figure upon this question of municipal growth with great care and caution, because, if in constructing their systems they overrate future population, there will ensue great loss because of appliances being in excess of the volume of business; on the other hand, if the plant should be planned on too small a scale, it will necessitate radical reconstruction and the expenditure of large sums of money.

Therefore, telephone companies must make a very thoughtful guess when they are calculating on the growth of cities, and there must be a method in formulating the guess. The particular guess with regard to New York city is that by 1920 there will be a population of 9,000,000 within eighteen miles of the city hall, and a population of 5,900,000 within municipal boundary lines. In arriving at this conclusion it is assumed that circumstances indicate that New York is to have a growth much beyond the average of cities in general. It is argued that "a city commercially pre-eminent is bound to attract to itself business and people in proportion quite unknown to less important places." In estimating the future population of New York the telephone engineers have carefully studied the effect upon the growth of population of improved rapid transit and taken into consideration the opening of the subway and of the Williamsburg Bridge, which they believe to be forerunners of many subways, bridges and tunnels.

In short, the telephone engineers base their estimates of future growth not so much upon past averages of expansion as upon present indications; the commercial, industrial and sociologic evidences that are in close perspective; and above all, upon the fact that municipal agencies are paving the way and making possible an enlarged population. Such a method of estimating is undoubtedly more reliable than the assumption that because a city increased twenty per cent in population from 1890 to 1900 it will therefore increase twenty per cent from 1900 to 1910, and maintain the same ratio from 1910 to 1920.

It is only necessary to recall that during some decades some American cities have practically doubled in population, to appreciate that past ratios of growth are of little value in making future estimates. During the present decade the growth of certain cities will undoubtedly be much above the average of municipal expansion, while in other cases it will fall much below the general average. Extended railroad connections, improved terminal facilities, enlarged river and harbor accommodations, cheap coal, quick transportation to and from business center and sanitary provisions insuring a high health average—all are factors affecting the growth of a city and must be taken into consideration when the problem of future estimate is being worked out.

TELEPHONE GERMS AND THE DOCTORS.

THE telephone transmitter as a disease-breeding vehicle, through the medium of germs deposited therein by infected users and conveyed to still other users by inhalation, is no longer looked upon in this country as a theoretical proposition, but as an accepted condition. This paper from time to time has reported the result of numerous tests, made by leading American bacteriologists in the interest of science, and without exception these investigations have all shown that disease germs in large numbers find a lodging and breeding place in the telephone—more particularly the public telephone—thereby infecting persons of weak constitution, who encounter this poisonous bacilli in the course of using unsanitary speaking apparatus.

Now, however, comes Dr. Collinridge, the medical officer of health for the city of London, with a report that somewhat shatters the popular belief that the telephone is a favorite resort for microbes bent on contributing to the support of the undertaking fraternity. Dr. Collinridge, previous to his investigations in this direction, had no pronounced views in the matter, according to reports. It was suggested to him that there might be danger of infection in the use of public telephone call offices. Diphtheria and tuberculosis were among the particular diseases specified as likely to be transmitted from one person to another by way of the telephone mouthpiece, and in view of the importance of the matter it was decided to make a bacteriological examination. With the sanction of the telephone company, twelve mouthpieces were removed from public telephone call offices, placed in sterilized water, and submitted to Dr. Klein for examination. As the result of experiments on two guinea-pigs, which were subjected to the possibility of infection from these mouthpieces, it was found that the animals were free from diphtheria and tuberculosis bacilli.

Of course, this may have been an exceptional test, in that it failed to show the presence of bacilli in the mouthpieces that were used in the investigation. Another test might—or might not—prove the correctness of the germ theory. It may be that the London physicians are lacking in microbe knowledge, as well as how best to develop these infinitely minute enemies of the human race, or it may be that Johnny Bull's general health is better than Uncle Sam's and that he is, therefore, not a victim of the germ-gathering habit. However, we are loath to believe that because this single test failed to uncover a colony of bacilli, that all English telephones are likewise free from germs.

As directly combating the results of the London investigation are the statements of a prominent Illinois physician, who recently has been carrying on a series of experiments along this line, and who has just made the results of his tests public. He says in part:

> More dangerous by far than the public drinking cup in the matter of transmission of diseases like tuberculosis is the telephone transmitter. How much of a factor is the telephone transmitter as a disseminator of infectious air borne diseases? Practical tests have demonstrated that every time an individual affected with a disease of the respiratory passages uses a transmitter he exhales therein countless numbers of germs, where they find a favorable breeding place for their preservation, until inhaled and taken into the lungs of those unsuspecting victims using the telephone subsequently, with resulting consequences, dependent upon the physical condition of the telephone user. Experimental work has shown that inoculations made from telephone transmitters, both public and private, upon nutrient media, have yielded the germs of tuberculosis, pneumonia, la grippe and various other micro-organisms. Infection with the grippe bacillus has been traced directly to the telephone transmitter in a number of cases. The difficulty in tracing a tubercular infection to this source lies in the fact of its insidious development into consumption, the period when its symptoms are manifested. How many thousands come to their family physicians annually to be told, after examination, that they are in the various stages of consumption; yet the family record, so far as hereditary taint goes, is clear. How the disease was acquired is a mystery.
>
> Is it not fair to presume that many of such infections are acquired through the mediums of the telephone transmitter, which, in

view of the foregoing unquestionable facts, must be considered more potent as a disseminator of infectious air borne diseases than the sputum deposited upon streets or highways? For the germs of the latter are in a great measure destroyed by the sunlight, while in the cuplike telephone transmitter they are protected. People hesitate to take up a public drinking cup and drink therefrom, yet they unhesitatingly put their mouths in close proximity to a telephone transmitter into which a consumptive or other infected individual has spoken a few moments before, and thus inhale countless germs. Yet in the drinking cup there is not one-hundredth part of the danger. Between the inhalation of the germs and the development of the disease there is not one requisite necessary—a soil suitable for their propagation. This is doubtless available more frequently than the majority of people conceive.

How to overcome this avenue of infection is the question confronting the public. The telephone is a necessity. Various devices have been patented, the principles of which are to close the opening of the transmitter. This in a measure is productive of some good, but it does not meet the essential requirement, namely, destruction of the germs. The antiseptic qualities claimed are practically nil. What is needed is a protective covering that will not interfere with the transmission of the voice and which possesses germicidal qualities so that all micro-organisms coming into contact with it will be promptly destroyed, and in this way one of the chief avenues of infection of human kind be obliterated.

Looking at the matter in the calm light of reason, and in the face of results attained through intelligent research, it would seem that the American physician has all the best of the argument. That telephone transmitters do breed disease germs there is no question of doubt. As far as the people in this country are concerned, the matter has resolved itself into a search for means to successfully combat the microbe of the telephone and eliminate, by scientific means, his ability to harm the human race.

SHOPPING AT NIGHT BY TELEPHONE.

SOME of the New York department stores are making arrangements to take care of all night orders received by telephone. One great advantage is the fact that the shopper can immediately file orders for bargains quoted in the afternoon papers, without the inconvenience of visiting the store next day and increasing the usual rush and strain upon the clerks. It is also claimed that deliveries by the stores are facilitated.

The newspapers in not a few of the other larger cities are urging the adoption by the business houses of this new plan, that the buying public may be given an opportunity to test the shopping-by-telephone-at-night idea that seems to be making headway in New York and other up-to-date business centers.

Some of the "bargain rushes" in department stores are almost historic, there being scores of instances on record in which hats and gowns were wrecked, great bodily discomfort endured, shoppers pushed under counters, and sometimes even more serious things narrowly averted. This is the age of progress, and it is only a question of time when night shopping by telephone will become a regular institution in every wide-awake community.

TRESPASS BY TELEPHONE.

THE invention of new machinery, devices and processes is continually bringing up new questions of law, puzzling judges, lawyers and laymen. The trolley brought its problems; the submarines, when they are used for commercial purposes, will undoubtedly pose the lawmakers; the power of modern guns on men-of-war has made obsolete the old three-mile rule as to the limit of territorial waters; and when the balloon shall become a passenger vehicle what wisdom will frame the rules of the road or the law of trespass?

Just now the law relating to the telephone is of interest. What constitutes a breach of the peace by telephone? Judge Brady of Kansas City has just decided such a case which, by reason of its romantic connection, appeals to all. Walter Clark had proposed to a maiden and had been rejected. He renewed his proposals over the telephone; called up the fair one several times, and was "turned down." He was not dismayed, but "called" in the morning and in the afternoon and in the dewy eve, and sometimes at night. The doors may be barred and a rejected suitor kept out, but how is the telephone to be guarded? Judge Brady took these questions under consideration, and ruled that after a girl had rejected a man she had the inalienable right "to have him stay rejected," and that the use of the telephone could and should be classed as a style of importunity amounting to a breach of the peace.

The theory of the law in these decisions is this: It would be a breach of the peace if the suitor should annoy the young woman with his presence, and the fact that the telephone was used does not modify the act nor the responsibility of the person performing the act. This seems to be good sense, and an indication that when the people of the United States shall all have "universal wireless connection" a man in New York or Chicago who calls an enemy in some far western city a hard name by "wireless" will hold himself liable, though the cost of prosecution would be prohibitive.

WHAT IS ELECTRICITY?

PROF. J. E. DOLBEAR in a highly interesting article in a recent number of the Popular Science Monthly deals with the science problems of the twentieth century. Touching upon the all-embracing mystery of electricity, Prof. Dolbear says:

"Here on the threshold of the new century we are confronted with the question, 'What is electricity?' and the answer implied by the question seems to demand a something which could be described by one who knew enough, as one would describe some new mineral or gas or thing. Some eminent scientific men are befogged by the question, say it is some ultimate unknowable thing, and hopeless as an inquiry. If it be a something it must be described by its constant properties as other things are. If it be unlike everything else, then it cannot be described by terms that apply to anything else. All material things have some common properties. A glowing coal is an incandescent solid, a flame is an incandescent gas, but neither glow nor flame exists apart from the matter that exhibits the phenomena. Both are conditions of particular kinds of matter. If electric phenomena are different from gravitative or thermal or luminous phenomena, it does not follow that electricity is miraculous or that it is a substance. We know pretty thoroughly what to expect from it, for it is as quantitatively related to mechanical and thermal and luminous phenomena as they are to each other; so if they are conditions of matter, the presumption would be strongly in favor of electricity being a condition or property of matter, and the question 'What is electricity?' would then be answered in a way by saying so, but such an answer would not be the answer apparently expected to the question. To say it was a property of matter would be not much more intelligible than to say the same of gravitation. At best it would add another property to the list of properties we already credit it with, as elasticity, attraction and so on. In any case, the nature of electricity remains to be discovered and stated in terms common to other forms of phenomena, and it is to be hoped that long before this new century shall have been completed, mankind will be able to form as adequate an idea of electricity as it now has of heat."

The telephone plays an important part in modern warfare. The government plans to buy 1,300 sets of telephones for the new fiscal year. Five hundred will be field telephones and the remainder will be used in coast defense forts.

Digest of Telephone Patents

Conducted by Edward E. Clement

794,742—H. E. Procunier. Soldering Nipple for Electric Cables.

This is a nipple for cable heads and the like having what may be called a "self-soldering" attachment. It comprises a tubular body through which the cable sheath is passed, this body being headed on the outside for screwing into the casing of the head or box; and on the inside the body has a ring of solder fitted in a circular cavity or counterbore. In using the nipple it is first screwed to the bottom of the casing, the cable sheath, previously tinned, is passed up through it, and heat is applied to the outside. The internal ring of solder melts and flows down around the sheath, the lower end of the nipple being taped to keep it from escaping. The parts are then cooled, and a good joint is produced.

794,790—A. S. De Veau and C. Ansh. Intercommunicating Telephone System.

In this system instruments are employed of the type in which push buttons are set around the base of a desk set, each when depressed, connecting the "home" or calling local circuits with a corresponding line to another desired station. In the circuits employed, a common-return call-battery wire is provided, a common-return talking wire, each extending to all the stations, and an individual wire for each station extending to all the stations, and connected to a normally open contact of a selecting button at each station. An important part of the present invention lies in the provision of means for securing secrecy or security from other stations "butting in" during a conversation. The means employed are simple. Suppose A desires to call B. A presses his button marked "B" and then takes down his receiver. The switchhook in rising, lifts the central rod *h* in the cut, and moves around a circular locking and contact plate (*m*) which holds the button when the finger is removed, in an intermediate position. The first or depressed position of the button put the "B" wire on the battery call wire and rang B's bell. The intermediate position of the button, in contact with the locking ring, connects the local talking circuit of A with the "B" wire, the circuit on the other side going to the common return talking wire. When B answers he connects his local circuit between his own wire and the common return talking wire, whereby a complete circuit is established between the stations for conversation. When secrecy is desired, A and B each push a special "secrecy button," which disconnects them from the common return, and completes between them a circuit made up of the individual "A" wire and the individual "B" wire.

When the receivers are hung up all buttons are released by the movement of their plates.

794,967—E. P. Baird. Telephone Support.

This is he of Evanston and the Baird Manufacturing Company. The invention is a transmitter-arm base-joint without a pivot bolt. The cheek plates are made each with a central depression on the inside, while the hub of the arm is made with larger depressions or counter bores. A pair of spring washers are used, one on each side, having tongues punched around the edges, formed up to stand out, and central bosses or teats to fit the depressions in the cheek plates. In assembling a pair of the spring washers are laid in the counterbores of the hub of the arm, teats out, and the hub is then forced between the cheek plates until the teats spring into the pivot depressions, whereupon the arm can be turned, the washers forming the pivots. This arrangement can, of course, be reversed, that is the central pivot teat can be toward the arm-hub, and the large openings for the springs can be in the cheek plates,

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794,985—F. G. Jones. Electrical Fuse.

Mr. Jones, of the American Electric Fuse Company, is a progressive and enterprising as well as a liberal man. He realizes that true progress depends upon strict attention to detail. In the present case he presents a substantial though subsidiary improvement in mica fuse strips, which consists in binding the fuse wire between two mica strips around and between the ends of which copper ribbon is wound and compressed. The fuse wire is left without tension, and is preferably soldered to the terminal copper between the binding strips.

795,072—M. L. Smith. Cut-out for Telephones.

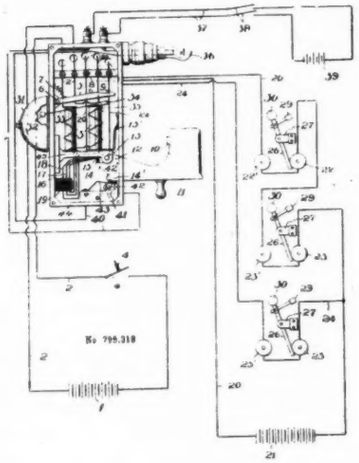
"Scotland's burning!" may be a purely traditional saying, but Mr. Smith is determined it shall not be truly said of his home in Scotland county, Missouri. He provides a handle on the inside of a building communicating with a gang-switch on the outside, by means of which all incoming wires are severed on the outside. This is simply accomplished by means of a fixed transverse frame carrying pairs of springs, upper and lower, forming terminal jaws for the outside wires, and a siliding transverse frame carrying co-operating terminal springs for the inside wires. When the sliding frame is withdrawn by pulling its handle, a bell crank lever is thrown over and an upper wide transverse insulating shield drops between the terminals, effectually preventing cross-discharges or arcing.

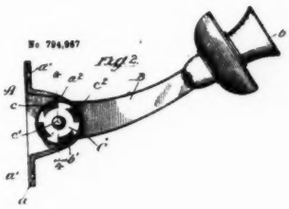
795,197—Frank B. Cook. Self-Soldering Protective Apparatus.

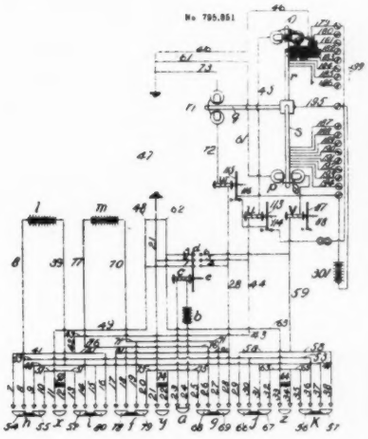
This is another of the combined high-potential and sneak current arresters for which Mr. Cook has stood a worthy sponsor. The objects of the invention are: First, to provide improved means for testing the protective devices and circuits through the apparatus without removing any of the protective devices from their operative positions; second, to provide an improved arrangement for grounding a live-spring and for closing an alarm-circuit when a protective device operates, and, third, to provide an efficient and durable construction in such apparatus which may be readily and cheaply manufactured.

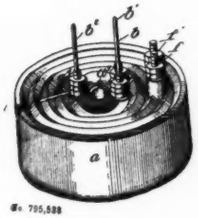
The heat coil used here is patented already, being covered by No. 776,218, issued November 29, 1904. The operation is as follows:

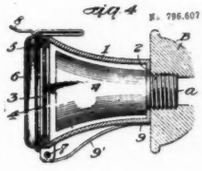
When an abnormally large current enters the apparatus, as from a line-spring *c*, it traverses the line-spring *c*, heat-coil *g*, and switchboard-spring *d*, and after a short time heats the heat-coil *g*, and thereby softens a heat-susceptible material which allows the body of the heat-coil to turn upon its axis and permit the portion *i* of spring *h* to turn the heat-coil and release itself therefrom to open the circuit through the heat-coil and ground-springs *p* and *c*, as shown upon the right of the figure. The circuit through the heat-coil now being broken, the latter cools, and thereby resolders the body thereof to the axis. The portion *i* of spring *h* may now be re-engaged with a tooth g^2 of the heat-coil to set the apparatus to operative position, as shown upon the left

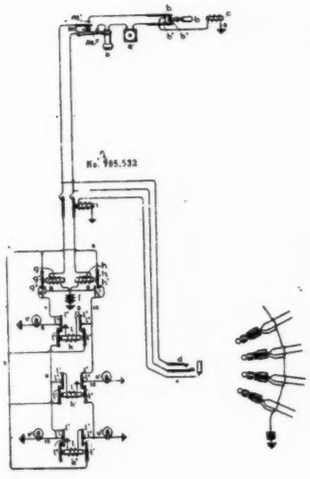


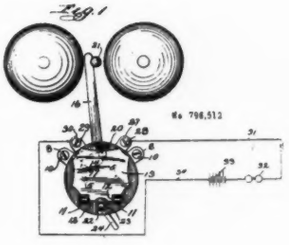


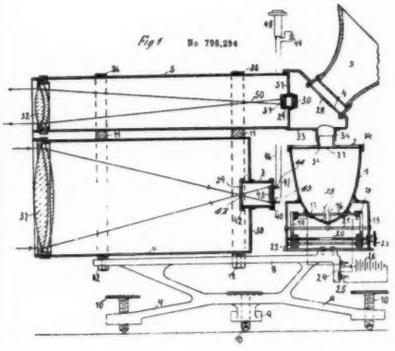


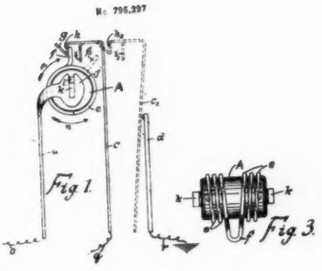


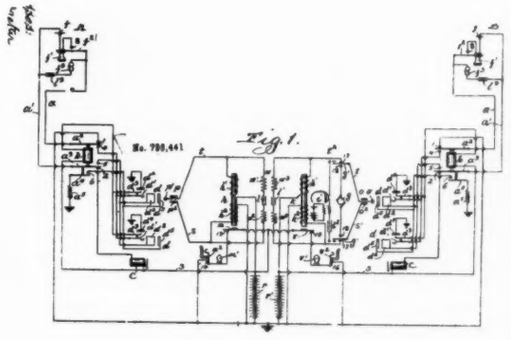


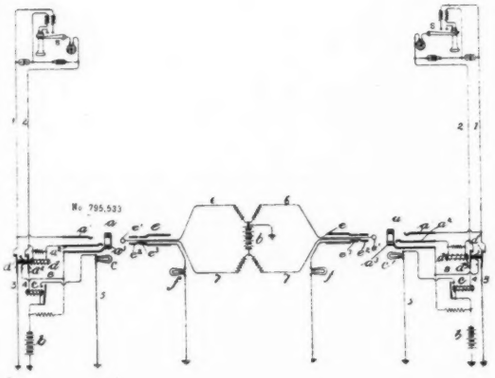


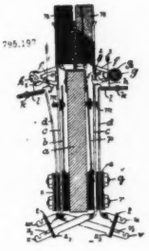


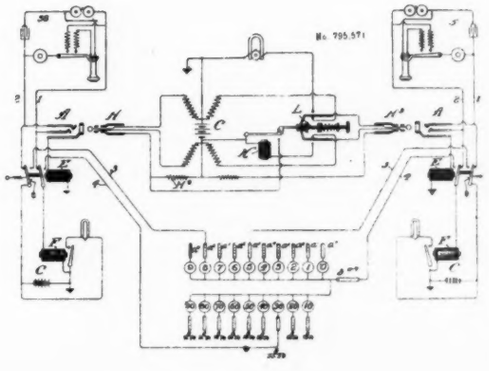












of the figure, the portion *o* serving to limit the movement of spring *d l h* when the apparatus is thus reset.

A feature of the invention is the testing means. A test plug carries the springs away from the heat coils and transfers their circuit to the test terminals. Some of the springs are crossed over to opposite sides of the frame or ground plate, to bring like terminals together, and insulating washers are threaded to the pairs to cause one spring of a pair to stiffen the other.

795,318—C. E. Grump. Annunciating Mechanism.

This is an alarm and check mechanism, primarily intended for use in hospitals but adaptable to telephone and other work. It comprises a circuit having a call arm like a semaphore for the nurse, an incandescent lamp above it, a bell associated with it, a magnet controlling the three, and other, polarized magnets controlling signals as pilot or check signals, as for instance in the head nurse's office, in the superintendent's room, etc. A tap or a key in a local circuit by a patient who needs the nurse energizes the control magnet, which reverses current on the circuit, and works all the signals, its own semaphore being tripped and falling by gravity. Mr. Grump, the manufacturer, is the head of the Novelty Electric Company of Philadelphia, and is responsible for many original and useful conceptions.

795,402—O. J. Lodge. Telegraph and Like Cables.

Sir Oliver Lodge, who received his knighthood for distinguished services in science, is among other things, principal of the University of Birmingham, and next to Lord Kelvin, probably the best known physicist in England. His work in connection with the study of Hertzian wave effects, and their application in so called wireless, or space, telegraphy, has been of great value, and contributed largely to make the devices of Marconi and others possible.

In the present case Sir Oliver sets forth a cable intended to have balanced or "neutralized" properties. With characteristic modesty, which might very well be imitated by some of our less known and less capable men here who have ventured in where angels fear to tread, and secured patents with broad claims on paper foundations, Sir Oliver only says his cable "approaches" the distortionless cable, the theory of which has been given by Oliver Heariside.

Such a cable theoretically transmits waves of all frequencies at the same speed, attempted in intensity but unaltered in shapes or characteristics, thus permitting greater speed of transmission in telegraphy, and "a sufficient approximation" permitting telephonic transmission.

Lodge assumes four chief electrical properties of a cable —resistance, capacity, inductance, and "leakance," and says a distortionless condition is attained if the four are so proportioned that the product of the inductance and leakance is equal to the product of the conduction resistance and capacity. He says it has been proposed by various devices to increase the inductance of a cable and in some cases to equate the inductance to the capacity, "which is impossible," to reduce distortion. It has also been proposed to provide an ordinary cable with leakance only; but none of these has done more than slightly improve the rate of transmission.

He attacks the problem in the following manner:

"The first part of my invention consists in constructing a cable in which provision is specially made for increase of both inductance and leakance, the conduction resistance and the capacity being both kept low.

"The second part of my invention consists in special means hereinafter described for increasing the self-inductance of the cable in a way favorable to rapid signal transmission.

"The third part of my invention consists in providing the required leakage to satisfy the condition indicated above by reducing the insulation of the dielectric, while maintaining its water-tight character. One way of doing this is by incorporating a fine power—say a suitable form of carbon, such as plumbago—in the insulating material. Another way is by keeping any permitted coating of high insulation, such as gutta-percha and rubber, very thin, and over that to lay a considerable thickness of a compound having inferior insulation. Another way is by introducing special high-resistance wire spirals reaching from core to sheath at regular intervals."

Concretely stated, the copper core is surrounded on the copper by disks or spirals of soft iron, and a poor insulator surrounds the whole.

Results from this new cable will be awaited with great interest.

795,403—A. Meyer. Telephone Call Register.

In this register, which is intended for attachment at the subscriber's station, a clock train has two hands on spindles geared to register hundreds and units. An actuating lever is pulled when the operator is ready to complete the connection, turning a toothed wheel, which vibrates an escapement and its verge rod, which latter kicks rapidly against a contact spring, and makes and breaks the circuit to line at a rate which gives a sound in the operator's receiver of definite pitch and duration, hence hard to imitate. In some cases he uses a gong, which the verge rod strikes with a clapper, the vibrations going to the telephone transmitter as usual.

795,473—S. B. Bankson. Annunciator.

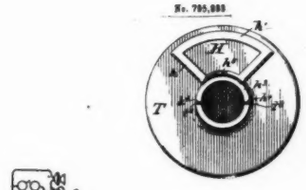
This is an annunciator system for hotels and the like wherein the clerk in the office can hear a room bell ring when he is calling the guest in that room. A receiver is connected in the office common return, shunted by a condenser, so that the makes and breaks of any bell ringing will be heard without too much sharpness.

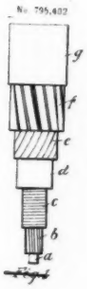
795,532—F. R. McBerty. Selective Signaling.

This is a scheme whereby a calling subscriber may indicate to an answering operator by signal which one of several switchboards or central stations he wishes to be trunked to. Three self-locking relays, *k*, k^1 and k^2, are used, four lamp signals, *e*, e^1, e^2 and e^3, and a pair of controlling relays, *g-h*, one from each side of line to battery *f* and ground. A key *b* at the subscriber's station, when the hook is up, grounds both sides of line and pulls up both controlling relays. Battery is thus put on the locking circuit 5 and kept there as long as either relay *g* or *h* is energized. To light lamp *e*, key *b* is rocked to open number 1 side of line, thus de-energizing relay *g* and closing *6-5-7-8* to lamp *e*. To light lamp e^1 key *b* is similarly rocked to open number 2 side of line, de-energizing relay *h*, closing *6-5-10-12*. To light lamp e^2, the same motion is made, closing also *6-5-10-11* and pulling up and locking relay *k*, cutting off lamp *e* and putting wire *7* through *9-13* and lamp e^2. The same motion will energize and lock relay k^1 and cut off lamp e^1, when a reverse motion added will light lamp e^3. Thus successive lamps are selected by rocking the key *b*.

795,533—F. R. McBerty. Telephone Exchange Apparatus.

This is a very curious arrangement, the application for which was filed in September, 1903. The main circuits are of the familiar standard relay type of the Bell company, but there are no supervisory relays, the line cut-off relays controlling the supervisory lamps. The cut-off relay, *d*, is in series between the jack and the line, and when a plug is placed in the jack, current from the cord to line pulls up the cut off, cutting off the line lamp-relay *c*, as usual, and also closing a ground 3-8 from a point between the battery and the jack sleeve. Hence the supervisory lamp *f*, which takes its current through the sleeves of jack and plug, does not light. When the subscriber hangs up, however, his cut-off relay *d* lets go and breaks the shunt 3-8, whereupon lamp *f* lights.


No. 795,888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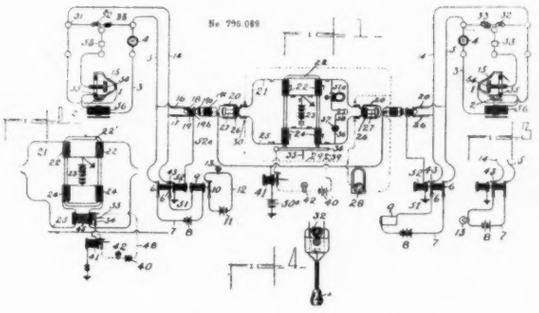
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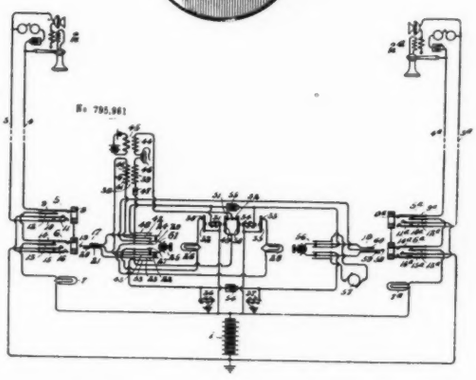
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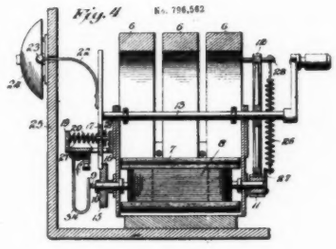
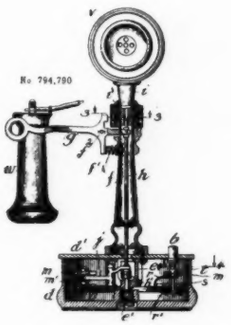


Fig. 4
No. 796,562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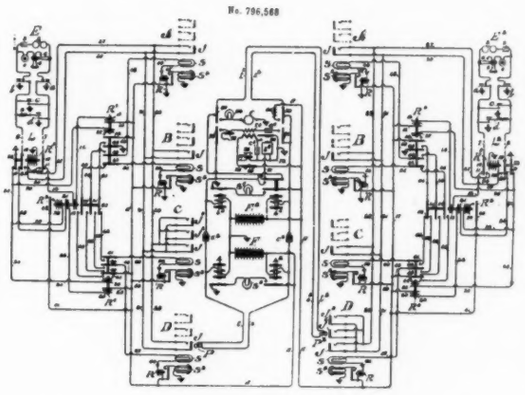
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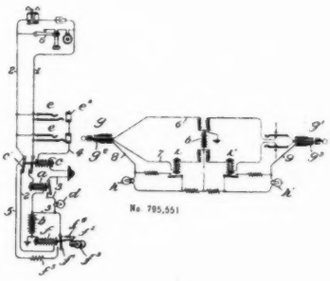

No. 795,551

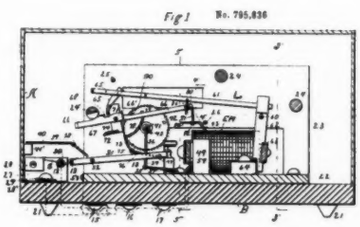


Fig 1
No. 795,836

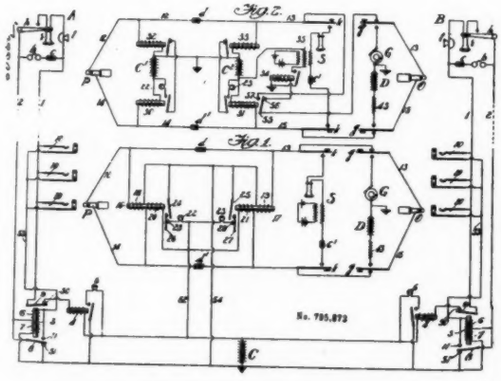
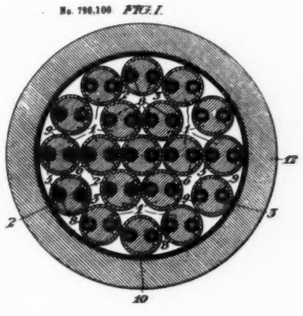
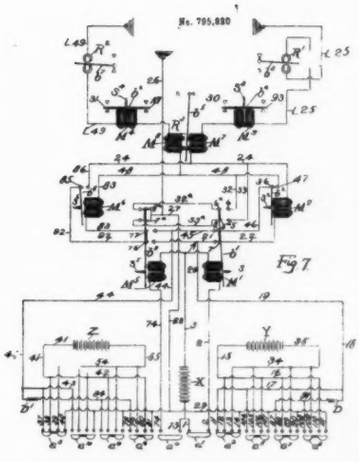


Fig 2.
Fig 1.
No. 795,873


No. 796,100 FIG 1.


No. 795,830
Fig 7

795,538—J. J. O'Connell. Protective Device for Electric Circuits.

This is a high potential arrester wherein the carbon line blocks c^1-c^1 and the ground block c^2 are held firmly together (separated electrically by mica) by a cap *e*, the metal posts to which they normally belong being bolted in the base, and the carbons removable by lifting them all off together. A cover, and weatherproof connections, make the device suitable for outdoor use.

795,551—C. E. Scribner. Service Meter for Telephone Lines.

A step-by-step recording meter for each line is placed at the central station, its operating magnet *f* being in series with the line signal relay so that it pulls up and takes the first step to register when the subscriber calls. When up, it is self-locked through a short circuit including one pair of the cut-off relay contacts. When the answering plug goes in, it is de-energized and registers.

795,571—H. E. A. André. Connection-Register for Telephone Exchanges.

This patent is assigned to the Western Electric Company by M. André, who is a Frenchman. He has a French patent also, No. 315,007, dated October 13, 1902. The invention is a register scheme whereby a common register at central may be worked by any one of a number of subscribers' lines, to record the number when calling. The recording mechanism itself is stated to be preferably a printer with a rotating paper drum, type bais substantially like those of a typewriter, and a set of magnets for operating them. The lines have circuit closing means for closing branches through these magnets in combinations, whereby the number of magnets required will be less than the number of lines served. Thus for 100-line circuits there are shown 19 magnets, in two sets, one for units the other for tens. Line number 64 would be so connected as to its register circuit as to close through the number 6 magnet of the tens set and the number 4 magnet of the units set. The joint action of these two magnets would, of course, print the desired number. This arrangement is elaborated throughout the case, the general arrangement in the diagram herewith being that of a complete exchange outfit.

795,820—A. G. Cox. System for the Selection of Electric Circuits.

This is not shown as a telephone circuit, but the opening statement in the specification is to the effect that it may be so applied also to the control of motors, lights, etc. The main line wires, L 25, L 49, go to a distant control station, and the operating magnets, N^3 to N^8, may be selected by combinations of strong and weak, positive and negative currents. At first a current comes over one or the other line wire and swings the floating armature C^5 one way or the other, its normal position being central. The current also passes through relays M^3, R^1, and M^4, R^2, the strength and polarity in each line determining the operation and consequent combination, which, as will be sufficiently apparent from the diagram, operates some one of the magnets, N^3 to N^8.

795,836—J. A. Hulit. Selective Call Apparatus.

This is quite an elaborate step-by-step party line or way station selector scheme for either telephone or telegraph systems. Dots and dashes similar to those of the Morse code are used, each selective device having a distinctive group of pins on its disk acting to disable the trip which withdraws a holding panel from a balance bar, the latter and a switch operating ratchet operable by a main lever. In calling, such combinations as the latter occur: Station 16 call, 5 dashes, dot, 2 dashes, dot, 5 dashes. With 12 dashes all stations may be called. With fourteen notches, 32 stations may be used; with 16 notches, 64 stations, etc. A table is given by which calls can be made up. It seems too elaborate for telephonic use, but an opinion based simply on the patent showing is of course not conclusive.

795,851—A. D. Neal. System for Selecting Electrical Circuits.

The object here is to select a particular circuit by means of what I may term "relay subdivision," using currents of opposite polarities and various strengths. The patentee speaks of control for lights, motors, etc., as well as telephones. The scheme shown is a general one. A pair of coacting relays are employed, and controlling pole-changing keys. By operating the key controlling one relay before that controlling the other any one of four circuits may be selected, and by reversing the order of operation any one of four others may be selected. Introducing another polarized relay, identical with one of the first pair, and working these two identical relays against the third, always two and never three together, sixteen circuits may be selectively worked. In each of these 16, four branches are provided, and a neutral relay in circuit with each polarized relay. Each neutral relay has two sets of sixteen contact screws, and the armature has sixteen contact plates held against one set of screws by a spring when a weak current flows, and drawn against the other set by a strong current. From the contact plates extend wires to contact screws on the non-polarized relay in circuit with the third polarized relay. The contact screws on the latter are joined together and connected with the armature of the third polarized relay. The contact screws of each of the other neutral relays are connected with branch wires referred to. Two wires of each set of four branches are connected each to a contact screw of one set on the neutral relay in circuit with the polar relay of that set, while the other two are connected to a contact screw of the other set of the same neutral relay.

Thus by reversing the direction of flow through the polar relay, by varying the strength of the current, and by reversing the order in which the polar relays are energized, any one of sixty-four different circuits may be selected.

795,852—A. D. Neal, Deceased. E. S. Neal, Administratrix. Electrical Relay.

The Neals are Bostonians, and this is a companion patent to that just preceding, presenting the relays employed therein. The first patent is assigned to Spencer W. Richard and Richard P. Elliott of Boston as trustees.

This device is really a pair of interlocking relays, each having an armature carrying a number of contacts, so arranged by operating either one before the other, any one of said contacts on one armature may be connected upon actuation of the second relay with any one of the contacts of the other.

795,872—H. G. Webster. Telephone Exchange.

This patent is assigned to Milo G. Kellogg, personally. Mr. Kellogg has announced that he is in the saddle and will produce better things than ever, which will soon be announced, in the line of multiple board and automatic systems and others. Uncertainty lends additional interest always, and the present patent will undoubtedly receive some attention as a forerunner of what may come. The scheme includes line, cord circuit, and test, for a two-wire multiple, and the application was filed, November 16, 1904. There are 38 claims, after the fashion of prolixity set by the original Kellogg attorneys.

The tip side of line goes direct to the jack springs, and through normally closed cut-off contacts 50 to line relay 4 and battery. The sleeve side of line goes through one winding 7 of cut-off relay 3 to jack thimbles and a branch

goes through normally closed cut-off contacts *51* to ground.

The normal condition of the test terminals, irrespective of extraneous influences, is thus assured.

The cord circuit is on the lines of the old Kellogg four-relay cord, having condensers in the two sides, and bridged battery. The preferable form has differentially wound supervisory relays. The test is in this wise: In the diagram, suppose the tip of plug *O* to be touched to thimble of a busy line. A circuit is made through conductors *13* and *19* (or relay *17*) which changes potentials across condenser c^1 in the operator's bridge, thus producing the characteristic click.

When a cut-off relay takes current it pulls up and shorts its normally active winding, disconnects the jack thimble from ground, and uncovers its normally shunted winding, thereafter remaining in a ground tap from the sleeve side.

795,888—S. A. Beyland. Attachment for Transmitters.

This patent is assigned to the Dean Electric Company. It covers a card holder for transmitters comprising a frame, a pair of curved fingers or a split ring to screw down under the mouthpiece, and a notch in the front plate to take the bent over ends of the fingers or ring to prevent the frame from dropping around under the mouthpiece if the latter becomes a little loose.

795,961—E. R. Corwin. Telephone Exchange System.

This is a common battery system in which the line lamps at central are shown as lighted directly through the line, with cut offs in the multiple jacks—the talking contacts of which are in series. The operator's telephone circuit has a pair of contacts in parallel with each other and in series with the listening key, controlled each by one of the supervisory relays. Hence she can listen in only when at least one of the connected subscribers has his telephone hung up. As long as both telephones are in service the operator is out.

For test a repeating coil with three windings is claimed, one to each plug and the third to the operator's set.

796,022—J. A. Tornquist. Cut-Out for Telephones.

A lightning arrester of the flat-plate, spark-gap type, with a knife switch mounted on the line terminals and closing on the instrument terminals. The lightning arrester electrodes are carbon blocks mounted on the line and ground plates, held by through bolts extending through wood base, plate and carbon, the holes in the latter being large enough to afford a clearance around the bolts for adjustment.

796,089—E. E. Ries. Telephone Exchange System.

E. E. Ries is a New Yorker. He shows a common battery circuit in which a relay with two windings on each leg has two in each side of the cord (to talk through!) and the battery bridged between them. An armature is held up as long as either subscriber's line is taking current. When both hang up, all coils lose current, the armature drops, and the single clearing out lamp lights. A relay in the ground from third cord conductor takes current through the cut-off relay when answering plug is in, to put battery on the clearing-out lamp. The system does not afford double supervision, and seems to be of little practical value.

796,100—Charles E. Wilson. Electric Cable.

Mr. Wilson is the Keystone man, of Philadelphia. His cable is an attempt to neutralize the effects of capacity by those of self-inductance, which Sir Oliver Lodge says is impossible in completeness.

Mr. Wilson takes an iron wire, grooves it on opposite sides, twists it so as to make the groove a spiral, and lays his telephone wires with paper wrapping in the grooves. The magnetic effects in the iron are depended on to give the desired result.

796,254—R. W. Hartmann, Deceased. B. Saenger, Administrator. Photophone.

The old way of sending voice waves on a beam of light was not efficient, according to this gentleman, because, in his own language, "they disperse too much the light." He says hitherto the parabolic mirror has been used to send a pencil of parallel rays. He substitutes an elliptic mirror with a plane mirror covering it, and having a narrow circular central hole. He places a source of light in the focal point of the elliptic mirror, a "Bell's mouthpiece" at a convenient angle to the axis of the elliptic mirror, its "membrane" serving as a mirror for reflecting the pencil of rays from the elliptic mirror; and provides a "sending-tube" similar to an astronomical telescope. This is the sender. The receiver has at its front end an object glass adapted to bend a beam of rays to the center, and at the bottom or rear end of the tube a small camera obscura is fitted, with a narrow, circular, central hole in the focal point of the object glass. In this camera obscura is a selenium cell in circuit with a telephone.

796,441—K. B. Miller. Telephone System.

This case was filed February 4, 1901, and belong to the Kellogg company. As usual with the Kellogg cases, there is a redundancy of claims, thirty-four in all. The invention is a common battery line and cord circuit. The cord is divided by a repeating coil, in series with each winding of which a condenser is included. Across each end of the cord the main battery is bridged between the windings of a retardation coil, which forms also a relay closing a supervisory lamp circuit when inert. Plug seat switches open the lamp circuits when the cords are idle.

706,297—F. B. Cook. Automatic Restoring Thermal Protector.

This is a self-restoring heat coil protector. The core or axis of the coil is fixed, and the body is soldered to it, to turn thereon when the solder is softened. A coiled spring is wound around the body and engages the operating spring, so that on a rise in current and resultant heating the body will be turned. The spring only grips the body one way, however, so the device can be restored by simply pushing it back until the coil spring takes a fresh grip.

796,512—J. R. Hershey. Extension Circuit Closer.

This is a drop shutter (*13*) held up by a hook on an arm *16* engaging the clapper of the ringer. When the drop falls it closes a night alarm or extension alarm circuit.

796,562—T. R. Campbell. Telephone Call Mechanism.

This is a hand generator which when the crank *14* is turned will turn its armature *8* and send out ringing current as usual; but when the armature is quiescent the spring-pressed pivoted curved clapper rod *17* engages the notched disk *15*, and the generator is then a ringer, the armature vibrating between the field poles and tapping the bell when it receives current over the line.

796,568—W. W. Dean. Telephone System.

This patent is the property of the Kellogg company. It covers a four-division divided multiple board with common battery circuits. Three relays and a cut-off relay for each line take care of the four line lamps. One relay is included in each side of the line, and one is differential with a winding in each side. At subscriber's station four push buttons are used, one closing from each side to ground, the third across the metallic circuit and the fourth the same through a resistance. The main return wire from the relays goes to the live side of main battery. Four lamps are provided, one over the multiple answering jack on each division. The connections are obvious, the circuit employed being a standard Kellogg two-wire multiple.

Oscar Wentworth Rogers

It is with an unspeakable sorrow that we are compelled to announce this morning the death of Oscar Wentworth Rogers. His illness of two months' duration, fluctuating between the extremes of hope and despair, terminated Wednesday in a sanitarium at Martinsville, Indiana.

His body is en route here for interment, to arrive this morning at 10:25, accompanied by his widow. The remains will be conveyed to the home of his mother, after which the details of the funeral will be arranged.

At this time we cannot say all that deserves to be said of this remarkable man. He had vast plans for the future that embodied great benefits to all mankind.

But he can never realize the fruition of his noble ambition. Disease and death have combined to deprive him of this. But the busy, strenuous years of his later life were not in vain. The plans and purposes in which he sacrificed so much are preserved in the hearts and minds of men he loved, who are capable and willing to forward to their highest perfection the interests he held so dear.

Oscar Wentworth Rogers was born in West Union October 2, 1850, the first white child born within the precincts of our city. Here he grew to manhood, and here he entered upon the practice of law with his father, the late Judge Jacob W. Rogers. And here his nervous, tired body will be laid to rest.

A more extended obituary with a fuller tribute to his life and genius must be deferred to a later issue.—*West Union (Iowa) Gazette, Friday, August 18, 1905.*

THE issues of all human action are uncertain. No man can undertake to predict positively that even virtue will meet with its full reward in this world; but this much may be said with entire certainty—that he who succeeds in marrying his name to a great principle, achieves fame as imperishable as truth itself." This quotation from Stephen A. Douglas may, with propriety, be applied to the life of Oscar Wentworth Rogers. Mr. Rogers had succeeded in "marrying" his name to the great principle of sincerity. No man who knew him will take issue with this statement. And it is to be sincerely regretted that more men did not know him. His life, as we were permitted to know it, was one of intense labor, anxiety and distress. Anxiety and distress because, with all his magnetic personality and vigorous action, he could not, in a moment, achieve successful culmination of his plans for the betterment of his fellows. It was Clarendon who said of Cromwell, "His parts seemed to be raised by the demands of a great station."

Mr. Rogers was master of men—not necessarily the average man, for his associates were high in the councils of the nation's most influential leaders. To himself his plans were always reasonable, though beyond the comprehension of the casual commercial adherent, and ever staggering to those who reckoned without full knowledge of the mental power behind the advocate. The outward life, the apparent unsuccessful achievements, so far as his plans were concerned, will appear to most of our readers a tragic and pathetic story. He will likewise appear to have been peculiarly unfitted to the people and the time in which he sought to accomplish his purposes. But his enlightened love for the traditions of the past; his passionate aversion to the commercial greeds of capital; his forceful eloquence and logic in presenting his opinions would have changed any wrong impression had the personality of the man been everywhere present. Mr. Rogers was marvelously active; his capacity for labor—labor of the most wearing, trying sort, that taxed his physical as well as his mental powers—was unlimited. Problems that would have hopelessly confused the ordinary mind were to him as clear as day, and the manner in which he handled these potential questions which were so important a part of his life was no less than amazing, and stamped him as a man of undeniable genius in his sphere of activity.

TELEPHONY came to know Oscar Wentworth Rogers when he was seeking a telephone franchise at Hamilton, Ontario, April 15, 1903. The Hamilton press was teeming with a wealth of alleged facts and figures of the American Bell Telephone Company. These articles bore the signature of Mr. Rogers. Letters directed to the author received no attention. In August, 1903, Mr. Rogers first visited our offices. We printed his first contribution in TELEPHONY in September, 1903, and the last in May, 1905. His advertisements, which he preferred to call his "accounts," were commenced in December, 1903, and ceased with his sickness. The files of our publication will disclose no comment on the work of this extraordinary man. No one dared suggest that he do other than he pleased. Telephone men of prominence in all parts of the industry knew him. All will regret that the end has come.

As an appreciation of Mr. Rogers, the following letter from the Hon. James S. Clarkson of Iowa, written under date of September 17, 1903, is published:

My Dear Mr. Rogers: I feel that I should in some more formal and permanent method than by mere verbal conversation or assurance, give in my adhesion to your enterprise. I call it an enterprise, because it has from the first presented itself to me as being far more than a mere business venture or a commercial undertaking. I admit, too, that I am responsive to the call of it much more because of the chance it appears to offer to serve the needy cause of the people at large than for the promise of profit that it offers, however alluring it may be. In my forty years of public and private business life, it has been my lot to be a personal witness to the remarkable evolution of corporations and of corporate power in the United States in the last generation, and a close observer of their gradual and relentless trespass upon the rights of the people in seizing to themselves profits so large as never to have been fairly earned, and in denying to the people a service in the necessary things of life at a reasonable remuneration.

In the old days of fair play between men and between the people and the corporations, it was always admitted by the people that capital had a clear right to make a ten per cent profit, and in that day capital was satisfied with such profit. In the evolution of the last thirty years capital has taken to itself nearly all the public privileges and used their great semi-public power, so confidingly trusted to them by the people, to compel such large and unearned profits as the world of business never knew before. This has gone on until all corporations, nearly, now base all values and all rights of profit not on actual capital invested or service rendered, but solely on possible earning power—an assumption by which they use the public privileges generously granted by the people, to water their stock five or tenfold and to compel a profit on such fictitious values, thus making the people pay two or three, and often five, times as much as they should pay for a semi-public service. The defense of the corporation when challenged with such a gross offense against both the public and private rights almost invariably is to admit that the actual value of their corporation property is not what they claim for it, but that in twenty-five years or more the development of the country and the growth of business and traffic will make their property worth all that they claim for it now. To me there is a double offense in such assumption: First, in charging this generation two or three times as much as it should be charged for service; and, second—and even more wrong—in their seizing to themselves thus far in advance the legitimate profits of the people of the next generation as well.

Having these views, your ambition and purpose to bring into commercial use a device which would not only greatly cheapen the cost of many things which are of increasing necessity and convenience to the people in the growth of civilization, but which you will employ to the end of reducing the price to the people and the betterment of mankind generally, have appealed to me far more strongly than the opportunity to make money. Your proposition to come upon the commercial scene in this day of grasping corporation greed and to offer the public a better service in many im-

portant things than it is getting now, on a basis confining the new corporations to a profit of eight per cent, brought the conviction to me that if I could aid you in a consummation so much to be desired by every man who is fair, I ought to do it. This feeling has been heightened by the tie of sentiment between us and the common love which we bear for a great state, a state which it was our fortune largely to see made and a state in which our fathers before us, strong and sincere men in a time of need, bore a prominent, useful, and faithful part as pioneers, in helping to shape it into the great commonwealth which it has come to be. As an Iowa man, I knew of the good record of your father and of his work, which made the name of Rogers historic in that state. I knew also of the inspiration which you took from your father's career and the desire to gain increasing honor for the name of Rogers in a state where his name is already a part of the public treasure; therefore, when you proposed to take the initiative in your enterprise in the state of Iowa and to use that ground, occupied by people peculiarly enterprising and as peculiarly fearless, as the chosen place to test your enterprise, I felt I should go with you and give you whatever aid I could render to you in your praiseworthy effort.

I am ready to do my part, and while I do not presume to be able to judge either of the actual merits or the usefulness of your new discoveries in the greater and quicker forces of nature for the service of man, I do have faith in your sincerity and am willing to follow you and to do whatever I can to aid you. I find pleasure also in coming into association and co-operation with men of the character and purpose in life of Senator Towne, Mr. Wright, the Blanchards and others who are identifying themselves with you and who believe in you and are sympathetic to your ambition to benefit your fellowmen, as well as for the reasonable profit of the business companies you will form. Never was the time so ripe as now for the inauguration of a public enterprise which has for a large part of its purpose a sincere intention to help in finding a fair solution, as between capital and the people, of the great problems now so seriously menacing our country. I am ready for such work as I can do, and will go to Chicago to meet the gentlemen in interest for this work in Iowa, if you shall desire it.

THE LATE OSCAR WENTWORTH ROGERS.

That our readers may get a closer insight into the personality of Mr. Rogers and learn something of his gentler side—his poetic nature—we herewith present a few excerpts which were published at various times in his "accounts":

I was born in Iowa. For forty years I lived in West Union. I saw it grow from one log cabin home to its present prosperous size. I know and love the people. There my children were born and their mother rests in the beautiful cemetery on the hill. There my father lived and died. West Union is but a type of most of the towns of Iowa. So when it became possible to settle the questions in which I have heart interest, I determined to start in West Union.

* * * *

The labor of God has given to man, forever, the earth and the fullness thereof. Each human being has been born in the home of his father and mother, and that home is sanctified by the labor of that father and the travail of that mother—glorious pledges of the divinity in mankind. Every human being has an absolute right to all the necessities of life, and the great object of society should be that of lessening the horrible resistances to life by a proper use of all matter of the whole earth. The struggle for life has been ceaseless and almost hopeless, because man has not known how best to use the matter God has given him.

* * * *

The time has come to put brains and courage and integrity ahead of money. Every man and woman, who wishes to be right, will now demand a hope for every child born or to be born. The cry of the earth is now ringing in the ears of man, making his heart beat with something—a little something—like a mother's love, as he marches out from the grinning shadows of greed and cruelty. The entirety of the energy of the universe is now given to man—and for this little time God bids him to his work.

* * * *

St. Louis, May 20, 1904.

Here, while I write, I am looking out upon the beautiful domes and spires of the world—beneath which are the examples of mankind's best effort toward civilization. Here new friends are joining old friends in a greater effort to bring to the world a civilization that will make the past with its violence and its wars seem like the memory of a hateful dream.

* * * *

To the Pioneer Mothers and Fathers of Fayette County, Iowa:

I know I was born at West Union. My parents gave me a healthy and sanguine body and mind. They worked for their children and the community all their lives. The father is dead—the mother still works. So it is with you all. The life of one pioneer is the life of all pioneers. I grew up with your children, and remember them. All that I am is owing to the memory of my father and the life of my mother—to the friendship of you all and to the society of the place. I have many friends—some of them the great of the earth—but I do not owe them my life. So at West Union there shall be shown the method of redeeming mankind from the sacrifices of almost slavish work necessary to get the necessities of life.

And as I work I remember the toil of you pioneers—your unselfish sacrifices—your humble but rugged faith in God and man—your sublime courage. All these I shall remember when the world is accepting my plans. I would give all I am to get for them if my father could see the fruition of my work. It cannot be. Therefore, a great necessity is upon me to turn there and let these things, once accomplished, witness his life's relation to the working out of the great problem of life and death.

* * * *

St. Louis, July 20, 1904.

The power of human beings is upon us. We see not alone trade and commerce—we feel that the earth is really being made free and whole from cruelty, greed and war. Man is learning to control the elements and to remake his conditions. My wish is that every Fayette county farmer may see this Fair—that he could fill his mind with the certainty of the good in man—that he could grow weary with looking at the evidences of the power of man—and then at evening, that he could stand upon the hill and see the marvel of every man saying, "Let there be light"; could see, out of the darkness, the glimmer from millions of lamps slowly growing into full radiance—shining upon the spires, domes, roofs and walls of glorious buildings, and upon the streets of the cities of

the earth—could feel the miracle of it all and so know the touch that makes all men kin.

The following biographical sketch of Mr. Rogers is taken from the West Union Gazette of August 25:

Oscar Wentworth Rogers was born in West Union, Iowa, October 2, 1850, and died in a sanitarium at Martinsville, Indiana, August 16, 1905. He grew up with the town of his birth, the lack of opportunities for schooling in his earlier years being well met by the care and attention of his father, Judge Jacob W. Rogers, and when the schools were finally established he became one of the foremost students, a position he held until that time when he surpassed the facilities of the pioneer schools. He early selected the law as his ambition, and after a course of reading at home entered the law school at Albany, New York, where he was graduated with honor, returning to West Union and entering upon active practice in partnership with his father.

In his youth and in all his later years he was possessed with that rare intuitive faculty for acquiring knowledge. He knew not the drudgery of the student, but absorbed into his being all the sciences and all the learning of the sages that especially appealed to him—that faculty which, from the lack of a more fitting word to express it, we call genius. He simply opened his receptive mind and all knowledge became a part of himself. All the details of the most intricate science, its manifold branches and variations, he had at his tongue's end; mechanics, commerce and all the varied industries he seemed to know intuitively, particularly all those features of science and art directly or remotely associated with that subtle fluid we know as electricity. For the past dozen years his life was wrapped up in a device of his own development for drawing from the heart of nature a new and peculiar current of electricity to be devoted to the service of humanity. Almost without exception among men, he unselfishly planned to give the world the benefit of his discoveries. His soul agonized over the cruel and heartless exactions of the corporations and trusts that have been able to monopolize so many of the necessities of modern existence, and he had often voiced his indignation in words of living fire.

It was his wish to live to help break the force of these heartless corporations, that the multitude might profit in these modern utilities now reserved to the few. But in the midst of the struggle, like a brave knight on the field of battle, with his colors flying and his face to the foe, he falls and dies. To us it seems cruel that one who had so much to live for, who after so long a period of darkness and doubt, just as the dawn was ready to cast the rosy light of success across his pathway, should be deprived of life and the fruition of his fondest hopes.

Mr. Rogers was married to Miss May Putnam in Boston, Massachusetts, May 30, 1874, bringing his bride to West Union, where were born their two children, Sidney W., now of Newport, Washington, and Ruth, of Pueblo, Colorado. Neither of them was able to be present at his funeral. Mrs. Rogers died in Chicago in 1892, and is buried in the family lot of our home cemetery. September 16, 1898, he was married to Mrs. Rose Wright Bryan, daughter of Timothy Wright of Chicago, whose mental and educational acquirements eminently fitted her as a worthy companion of one so highly endowed, entering into his work with an interest and enthusiasm second only to that of himself. A large responsibility is left to her in fulfilling the letter of his desires regarding the future of his great enterprises.

In the first attack of his final illness, while en route from the west, about two months ago, he hastened to her, as against the advice of a physician at Pittsburg, who recommended his entering a hospital there. He rallied at once and promised a speedy convalescence, and as soon as sufficiently recovered, they journeyed to Anderson, Indiana, the home of his friend, Dr. Littlefield. Here, after a few days, he suffered a relapse, and was conveyed to the sanitarium at Martinsville, Indiana, where all that loving hands, tender care and skillful physicians could do was done to stay the ravages of his disease and ward off the dread messenger. Mrs. Rogers brought the body to West Union, arriving on Friday last. An autopsy was made by special request by Dr. Ainsworth, assisted by Dr. Thos. A. King, which resulted in finding numerous gallstones.

The funeral was held Sunday, August 20, at 2 p. m., in West Union, at which time the following eulogy upon the life of Mr. Rogers was pronounced by H. P. Hancock, an intimate friend of deceased:

Neighbors and Friends: I have been requested by some of the near friends of Oscar Wentworth Rogers to make a few remarks with regard to his life and character, to me one of the most remarkable that I have ever known. I wish that I possessed the eloquence of Mark Antony when he spoke at the bier of his friend Caesar, so that I might speak fittingly of some of the most beautiful qualities of our friend who has died. He was one of the first acquaintances I made when I came to West Union about twenty-five years ago, and we were for years neighbors. I feel that I knew Oscar Wentworth Rogers as well and as intimately as any citizen of our town. He had a large brain and an even larger heart, as all who knew him, even most casually, never failed to recognize. As an attorney I saw him in the court room and in the office. He was what we lawyers term "a hard fighter," but he was always a generous enemy. As a neighbor he was kind, sympathetic and whole-souled.

He removed to Chicago in 1890, and shortly thereafter began devoting himself to the mechanism with which his name has been connected, because in it lay, he believed, the possibility of emancipation from poverty and discomfort for the "common people." Mr. Rogers, in the development of his electrical discoveries, worked night and day with a pertinacity that was remarkable, making it his whole object in life. In these times of political and commercial greed, when it seems as if the conscience of the public is being corrupted, his aim in life never wavered. In my office not long ago he said, "I tell you, Hancock, there is nothing in mere business prosperity. I have lived on a pittance a day many times for this thing, and I have often been offered hundreds of thousands of dollars—yes, millions—for fractional interests, if they were turned over to corporations and syndicates, but was never for one moment tempted thereby. Of what comfort is wealth gained at the expense of one's fellows?"

About a year ago some of us from West Union went down to Chicago to meet Mr. Rogers and friends of his who were interested in his invention. Among them I met General "Ret" Clarkson, and F. C. Blanchard of the Prudential Life Insurance Company. In talking with Mr. Blanchard, I said to him, "I understand that you intend to make the first experiments at West Union." He said, "Yes, we down in New Jersey have told Mr. Rogers that we would be willing to build telephone lines there or in New York for experiments, and, in fact, we are also willing to build a railroad in either state for purposes of experiment, but Mr. Rogers said, 'No, I am going back to West Union, where my father lived and served and died, and where my mother reared their children *and yet lives*, and in their honor, and because of the sentiment every man should cherish for the town in which he was born, I will begin my work for the whole world there.'"

All this shows you the remarkably high esteem that men of character and standing felt for Mr. Rogers, and I want to read to you an extract from a letter written to a mutual friend in this city a week ago, when all hoped our dear friend would be restored to us: "There has always been to me something very noble in the intensity and the determination, and also in the boundless generosity of his efforts and his plans. His motive to help his fellowman and to make his name honored, rather than the mere gain and greed of making himself rich, won me to him at the first, and has always held me to him. The quality in him that could win the faith of such spirits as Messrs. Wright, Loeffler and Coker, and in a less degree, or rather in different lines, the faith of the Blanchards, has also been strong with me. They have so melted themselves and their careers in him and his purposes, that their success now appeals to me for realization as powerfully as his own. In the effort of him and of them, and the fidelity and courage of it as against all obstacles and a scoffing world of science, has been shown the finest spirit I have ever seen men show. So equally for him and for them I covet success with almost religious hope and faith."

Now, in that letter, my friends, there is more than a sermon. All creatures come and go and have their being, and their end. Nations come and go. Men come and go, but life is a great thing. How has one spent it? Has he helped his fellow man? Has he done that which ameliorates public suffering? By such an estimate I should say that Mr. Rogers has been *great* in the true sense of the word.

At the head of his coffin stands a sheaf of wheat sent by the club of which Mr. Rogers was a charter member, only two of that number now remaining. Who was the man who prepared the soil which produced that wheat? Who cultivated and garnered that wheat? We do not know, but those who are fed by the bread made of it, owe their life to the sower and those who followed him in labor. So did Mr. Rogers sow the seed which others shall till and garner, and is not here to see the fructification of all his labors. For some unknown reason "the silent messenger" came and called him from among us, and he, down there in Indiana, far from the scene of his late labors and scientific achievements and from the home to which he was returning, laid his head upon his pillow to lift it nevermore, leaving his work to those who should assume it after him, and its fruitage to "The Many" for whom he toiled.

The preliminary funeral services were held at the home of decedent's aged mother, Mrs. Jacob Rogers, the public funeral being held at the Presbyterian church, the Rev. Mr. Gageby officiating. The pallbearers were C. H. Talmadge, H. P. Hancock, T. L. Green, F. Y. Whitmore, of West Union, Ed. Hurmence of Sumner, and Fritz Loeffler of New York, who kindly took the place of Vic. Stevens of Dubuque, who was unable to reach West Union in time for the services. The H. A. L. Club constituted the honorary pallbearers.

National-Interstate Telephone Association

Official Bulletin Number Two

OFFICE.

All arrangements have been made for collecting and keeping on file complete data in regard to the Independent situation in the various states. Associations and individual companies are asked to respond promptly to requests from this office for information or data, and to refer all inquiries of any kind in regard to telephone matters to this office. All information received by the Association when so requested will be considered strictly confidential, and will be given out to no one without the consent of the parties furnishing same, and then only after the Association is satisfied that the information furnished will not be used in any way that may be detrimental to its interests or the cause of the Independent telephone movement.

STATE ORGANIZATIONS.

Indiana: A meeting of the Independent telephone interests of Indiana was held at Winona Lake, July 12, and an organization formed under the name of the Indiana Independent Telephone Association. The National-Interstate plan was adopted, the state being divided into eleven districts. Officers of the new association are as follows: President, George W. Beers, Fort Wayne; secretary and treasurer, Charles S. Norton, Indianapolis; with a vice-president for each district. Mr. Beers is also a member of the Executive Council of the National-Interstate Telephone Association. Constitution and by-laws of the new Indiana Association have already been printed and distributed among the members. Stationery, etc., has been prepared, and before the first of October a meeting will have been held in each separate district, and the local organizations completed. The Independent situation in Indiana is in a very healthy condition. James B. Hoge, president of the National-Interstate Association, attended the meeting at Winona Lake.

Illinois: The Illinois Independents held a meeting at Peoria on August 7 and 8, and effected a state organization under the name of the Illinois Independent Telephone Association. They also adopted the National-Interstate plan, and divided the state into eleven districts, electing a vice-president for each. The following are the other officers: President, E. R. Conklin, Aurora; vice-president, Manford Savage, Champaign; secretary, Hon. C. C. Cheadle, Joliet; treasurer, C. S. Hankin, Decatur. Arrangements have been made to hold meetings in each of the various districts some time early in the fall, at which time the district organizations will be completed. The National-Interstate shield was adopted as the official emblem. James B. Hoge and A. L. Tetu, President and Secretary, respectively, of the National-Interstate Association, were present at the meeting.

COMMITTEE ON LITIGATION AND LEGISLATION.

Hon. O. S. Berry of Carthage, Illinois, has been appointed and approved as the fifth member of the above mentioned committee, a vacancy being left by the officers when making up this committee in order to give Illinois representation when the state had been organized. The other members of the committee are: Dwight E. Sapp, Mt. Vernon, Ohio; Edward E. Clement, Washington, D. C.; Breckenridge Jones, St. Louis, Missouri; J. B. Ware, Grand Rapids, Michigan.

SUPPLIES, PRICE LIST AND CATALOGUE.

Arrangements have been completed for handling standard toll signs and transparencies, as well as directory covers, stationery, business cards, etc., bearing the official shield, and also various sizes of electrotypes of this emblem. Quite a few orders for some of these supplies have already been filled. Preliminary price list has been prepared and will be sent to anyone interested. Complete catalogue is at present in the hands of the printer, and will be ready for distribution within the next ten days. By ordering from us you are sure to get good goods at low prices. Any profits made will be used to help carry on the Association work. Address all inquiries to The National-Interstate Telephone Association, 708 Electric Building, Cleveland, Ohio.

MONTHLY BULLETINS.

Independent telephone men in all parts of the country are requested to forward all information regarding the situation in their respective localities which they think would be of interest in making up these bulletins, and to call the attention of the Association to any attacks which may be made in their local papers upon Independent properties or officials in any part of the country. The Association will arrange to get the exact facts in the case and publish same in order to correct any wrong impressions due to false or misleading statements which appear from time to time in the daily press.

General Headquarters, 708 Electric Building, Cleveland, Ohio, August 22, 1905.

Telephone Tales Tersely Told

The Siloam Springs (Ark.) Telephone Company recently installed a new switchboard with 6,800 connections.

A new switchboard with an ultimate capacity of 2,000 has been installed by the Home Telephone Company of Goshen, Indiana.

The Independent telephone companies of Los Angeles and Salt Lake City are co-operating in the construction of a line to connect the two cities.

Charles E. Prentiss of Columbus, Ohio, was given thirty days in jail and fined $20 and costs for insulting Mrs. M. J. McDonald over the telephone.

It will be about six weeks before the new automatic system of the Citizens' Telephone Company at Columbus, Ohio, will be in full working order.

The La Porte (Ind.) Telephone Company has just issued its directory, which shows about 800 telephones in service, an average of one telephone for every ten residents.

The mutual telephone companies of Hamilton, Hardin, Story, Grundy, Marshall and Franklin counties met at Union, Iowa, and formed the Mutual Commercial Telephone System.

Plans are being formed for an Independent telephone company in Huntington, Indiana, to replace the United Telephone Company, which was recently absorbed by the Bell company.

Sherman, Texas, is soon to be made the central exchange for a great telephone system, covering several north Texas counties and giving service to farmers all over the adjacent country.

The Lancaster (Ohio) Telephone Company will greatly improve its exchange the coming year. It is estimated that $60,000 will be expended in Lancaster and $10,000 on the improvement of the country service.

The Independent Telephone Company of Boise, Idaho, will install a $20,000 switchboard about September 1. The board will be of the latest design and will have a capacity of 6,000 lines for 24,000 subscribers.

The Mutual Telephone Company of Des Moines has begun the extension of the company's lines in Polk county, which will mean an expenditure of $75,000. The lines will be for the benefit of rural districts only.

A New York firm, assisted by the Piscataqua Navigation Company, has completed the work of a putting a telephone cable across the lower harbor connecting Forts Stark, Foster and Constitution for telephone service.

In the first year of its operation, just completed, the Eastern Illinois Independent Telephone Company of Kankakee, Illinois, made a fine showing. It has 1,500 telephones in operation and is growing at the rate of fifty a month.

The Home Telephone Company of Los Angeles, California, is putting in a long-distance line from Los Angeles to San Diego, and the company has also let a contract for the construction of a line between Los Angeles and Pasadena.

The Independent Telephone Company of Council Bluffs, Iowa, is planning to suspend a telephone cable across the Missouri river to South Omaha, and will erect two steel towers 125 feet high. The cables will be above 1,800 feet in length.

The Home Telephone Company of Logansport, Indiana, has just issued a new directory, which shows a list of 2,900 subscribers. The company owns and operates over 200 miles of toll lines and gives connections with 165,000 telephones within the state.

The Prescott (Arizona) Electric Company and the Consolidated Telephone, Telegraph and Electric Company have consolidated in northern Arizona, and all lines north of Maricopa county are to be controlled by the Prescott Electric Company. The service is to be greatly improved.

The Ottumwa (Iowa) Telephone & Electric Company has just issued a new directory, which shows a list of 1,500 subscribers. The company has in all about 2,300 subscribers. The number is constantly increasing and to meet this demand the company contemplates additional extensions.

The Co-operative Telephone Company of Detroit, Michigan, will build four new lines to Jackson and Lansing by way of Ann Arbor and Howell. The capacity of the Detroit switchboard will be doubled and other improvements added, the total expenditure to be in the neighborhood of $25,000.

The Union Telephone Company of Galesburg, Illinois, contemplates the expenditure of $50,000 in building copper metallic lines, which will give connections with Moline, Rock Island, Davenport, Burlington, Quincy, Springfield, Aurora, Peoria and other cities. The company will also construct a central station at an estimated cost of $10,000.

General Manager French of the Cuyahoga Telephone Company of Cleveland says that on the first day of January, 1906, that company will have 21,000 telephones installed and there is every indication that his prediction will be fulfilled. On the first day of June the company had installed 17,127 telephones.

The National Telephone & Electric Company of Farmer City, Illinois, is installing a new switchboard in that city, and also at Clinton. This company, which has been organized about seven years, has met with great success. The company has nine exchanges, 37 toll stations, 3,500 miles of wire and about 2,500 telephones in service.

Judge A. G. Zimmerman and Attorneys Rufus B. Smith and Alfred T. Rogers have formed a $100,000 telephone and telegraph company, to be known as the Chicago & St. Paul Telephone Company. It will operate from Hudson to Milwaukee and other cities in Wisconsin, between St. Paul and Stillwater, Minnesota, and to points in Illinois.

It is estimated that $200,000 will be expended in the construction of the new plant of the Independent Telephone Company, at Council Bluffs, Iowa. Clarence Judson has been selected as chief engineer of the construction work and toll lines, and he thinks the construction will be completed sufficiently by Christmas to permit the opening of the exchange for business.

The plant of the Independence (Mo.) Home Telephone Company has been purchased by Theodore Gary of Macon, Missouri, vice-president of the National Independent Telephone Association. The purchase price was $50,000. Mr. Gary is owner of the local Independent plants at Carthage, Joplin, Webb City, Nevada, Macon and Columbia, Missouri, and Atchison, Kansas.

Preliminary steps toward forming a clearing-house company for taking care of the toll accounts of the various Independent telephone companies in Iowa were taken at Rockwell City recently. Twenty companies were present and joined the association. Another meeting will be held soon to complete the organization, and many applications for membership are expected.

J. C. Slippy of Waterloo, Iowa, has been placed in charge of the reconstruction of the plant of the Corn Belt Telephone Company, recently incorporated, to take over the interests of the United States Telephone Company. A thoroughly modern plant with a capacity of 2,400 will be installed at Waterloo. A new exchange building will be erected and about 30,000 feet of cable will be used.

H. W. Webb, president of the Maryland Telephone & Telegraph Company of Baltimore, announces that it is the intention of the company to extend its lines. Contracts have been placed for about $300,000 worth of material, which will include cables, wire, poles, telephones and switchboards. The company now has 9,000 telephones in use and it is the intention to increase this number to 15,000 by September 1.

The consolidation of all the important telephone lines operating on the eastern shores of Maryland and Virginia and the state of Delaware, and their merger into the Diamond State Telephone Company of Dover, Delaware, is being planned. The business of these several companies is so closely identified and their dependence on each other so great, that it is believed the interests of all will be benefited by the merger.

Manager F. M. Ashe of the Kewanee (Ill.) Home Telephone Company has made arrangements with the Stark County Telephone Company to connect with that system, and a line will be built immediately from Kewanee to Elmira, where connection will be made with the Stark county system over a line leading from Elmira to Toulon. This will give connection with 5,000 more telephones in Stark county and vicinity.

The Lafayette (Ind.) Telephone Company will expend about $75,000 in the improvement of its plant. The company has applied for permission to put its wires in conduits underground. If this request is granted it is the intention of the company to install the multiple system. The company was organized in 1895 and began business with 300 telephones, which number has now reached 2,500, including the West Lafayette exchange.

W. C. Polk of Toledo, Ohio, representing the Central Telephone Construction Company, has begun the work of overhauling the plant of the Home Telephone Company at Mobile, Alabama, which the Bell company made an effort to purchase a short time ago and failed. The work is preliminary towards arranging for a long-distance service which the company proposes to establish, and which, it is said, will extend as far as Syracuse, New York.

Personal

J. M. Lockhart has been granted a telephone franchise at Coalville, Utah.

J. W. Adams and associates are seeking a franchise in East Chattanooga, Tennessee.

Alexander Melville Bell, father of Prof. Alexander Graham Bell, died at Washington, D. C., August 7.

W. H. Moon of Toledo, Ohio, has been selected as manager for the Home Telephone Company at Vincennes, Indiana.

W. C. Polk has accepted a position as engineer with the Central Telephone Construction Company at Birmingham, Alabama.

Nathan W. Tarr has been granted a fifty year franchise to construct and operate a telephone system at San Bernardino, California.

W. G. Nagel and associates of Toledo, Ohio, have sold out their interest in the exchange at Clarkesville, Tennessee, to E. L. Barber.

R. L. Goudy has been sent to Nome, Alaska, by the Chicago Telephone Supply Company to install a central energy telephone system.

F. W. Roebling of John A. Roebling's Sons Company, has been elected one of the new directors of the Equitable Life Assurance Society.

Joseph A. Hebert has been appointed manager of the Citizens' Telephone Company of Terre Haute, Indiana, vice R. C. Duffin, resigned.

J. S. Haley, secretary of the Kansas City Home Telephone Company, recently was married to Miss Mamie Moore of Independence, Missouri.

C. H. Petty of St. Louis has been appointed manager for the Home Telephone Company of Webb City, Carterville and Neck City, Missouri.

J. C. Kenney, for twenty-two years purchasing agent of the Central Union and Chicago Telephone Companies, has resigned his position.

Z. G. Houck has been elected manager of the Citizen's Telephone Company of Kenosha, Wisconsin, to succeed J. W. Johnson, resigned.

Ed. F. Bamberger has resigned as manager of the Home Telephone Company at Huntsburg, Indiana. He is succeeded by O. P. Reed of Evansville.

J. O'Brien of Winnipeg, Manitoba, Canada, has been engaged to superintend the work of installing the new telephone system at Crystal City, Manitoba.

Nathan W. Tarr, recently granted a franchise between Mojave desert points, has applied for a new franchise and intends to build lines over the whole desert.

Frank B. Cook has suffered a severe attack of inflammatory rheumatism during the past month, but his many friends will be glad to learn that he is on the mend.

Dr. A. E. Kennelly of Harvard University is making a tour of England and the Continent, and with Mrs. Kennelly will be away on this vacation trip until the end of September.

J. E. Baumrecker has severed his connection with the Chicago Writing Machine Company as advertising manager, and accepted a lucrative position with a well known Chicago house.

C. W. Stiger, general sales manager for the Stromberg-Carlson Telephone Manufacturing Company, Rochester, New York, has resigned and will take a well-earned and needed rest.

Harry S. Loomis, for several years connected with the Valley Telephone Company, has resigned his position to accept the managership of the York State Telephone Company. at Towanda, New York.

H. Lambright, manager of the Home Telephone Company at Magnolia, Mississippi, has been elected manager of the Electric Light Company and also the Ice Manufacturing Company at that place.

H. S. Durant of the sales department of the Automatic Electric Company of Chicago, has been appointed manager of the new branch office which the company recently opened at Scranton, Pennsylvania.

J. A. Werner of Lake City, Minnesota, has been appointed manager of the Minnesota Central Telephone Company at Redwood Falls, succeeding J. Ambaugh, who takes charge of the exchange at Brown's Valley.

John A. Duncan, chief electrician of the Home Telephone Company at Fort Wayne, Indiana, has resigned his position to accept the superintendency of the Home Telephone Company's system at Sioux City, Iowa.

B. M. Burke of Carlinville, Illinois, is installing a telephone system in the village of Chesterfield.

Mr. and Mrs. G. M. Heiserman of Albia, Iowa, were recent Chicago visitors. Mr. Heiserman is president of the Albia Telephone Company and one of the successful Independent telephone men of the Hawkeye state.

Captain Baker of Bismarck, North Dakota, has completed arrangements for the construction of a long-distance telephone line from Bismarck to Jamestown. A line will also be extended from Bismarck to Linton.

Claude Eaton, one of the parties who recently purchased the telephone exchange at Sterling, Kansas, has closed out his telephone interests at Haven for $3,500, and will devote his entire time to the Sterling system.

Charles S. Davis, for the past six years master electrician of the Bureau of Construction and Repair, Charlestown Navy Yard, has joined the engineering staff of the Holtzer-Cabot Electric Company, Brookline, Massachusetts.

Messrs. Charles R. Lackey and John S. Lawrence have closed a deal with A. P. White, manager of the Globe Telephone Company of Cadiz, Kentucky, whereby they become sole owners and proprietors of the Globe system at Cadiz.

H. K. Cole, manager of the Home Telephone Company of Owensboro, Kentucky, has announced that he will enter the field about Whitesville and Utica, Kentucky, at once and establish a branch exchange at the two towns.

Clyde Carlos of the Ravenna (Neb.) Telephone Company has been appointed general business manager of the Central Telephone Company, which company has an extensive system of exchanges and toll lines throughout Custer and Valley counties.

A. L. Black of Bellingham, Washington, is said to be at the head of a movement to consolidate all the Independent telephone companies in Washington and other Pacific states, for the purpose of inaugurating a more extensive Independent service.

W. C. Polk has resigned as general superintendent of the Home Telephone Company of Kansas City, and is now associated with the Central Construction Company of Birmingham, Alabama, in connection with the work it now has in hand in the southern field.

E. W. Goram has been chosen manager of the Grayson County Telephone Company's exchange at Denison, Texas. Formerly this office was under the management of C. A. Shock, the Sherman manager, but will, in the future, be under separate management.

Will Daviess of Linn, Missouri, owner of the Osage County Telephone System, recently had a conference with Manager Houck McHenry of the Capital Telephone Company of Jefferson City, relative to a connection between the two systems, which has since been effected.

Manager E. W. Goram of the Grayson County Telephone Company at Denison, Texas, states that the company has in contemplation the extension of its system and the consolidation of a large number of farmer lines; also the construction of a large number of long-distance lines.

W. W. Allen of San Francisco has secured a franchise for a telephone system in Eureka, California, for which he bid $3,300. The franchise had already been sold three times, but the purchaser in each case forfeited his deposit by neglecting to pay the full amount of purchase price.

H. P. Yeager has resigned his position as secretary-manager of the Rome (N. Y.) Home Telephone Company, to accept that of traffic manager of the Toledo (Ohio) Home Telephone Company. A. I. Ketcham has been appointed manager of the Rome company to succeed Mr. Yeager.

W. G. Gunn has resigned as advertising manager of the Kellogg Switchboard and Supply Company of Chicago on account of ill-health. He will take an extended vacation before entering business again. He will first visit Canada, and will then go to his home in Portland, Maine, later taking a trip abroad.

H. B. Hewitt, the well known telephone salesmen, has severed his connections with the Stromberg-Carlson Telephone Manufacturing Company and accepted a position with the Swedish-American Telephone Company. He will have charge of seven states west of the Missouri river and seven salesmen in the territory.

Walter Blodgett of Detroit is conducting negotiations for the establishment of a new Independent telephone exchange in Benton Harbor and St. Joseph. The new company is known as the Standard Telephone Company, and will have central stations in St. Joseph, Grand Rapids and South Haven, in addition to the Benton Harbor exchange.

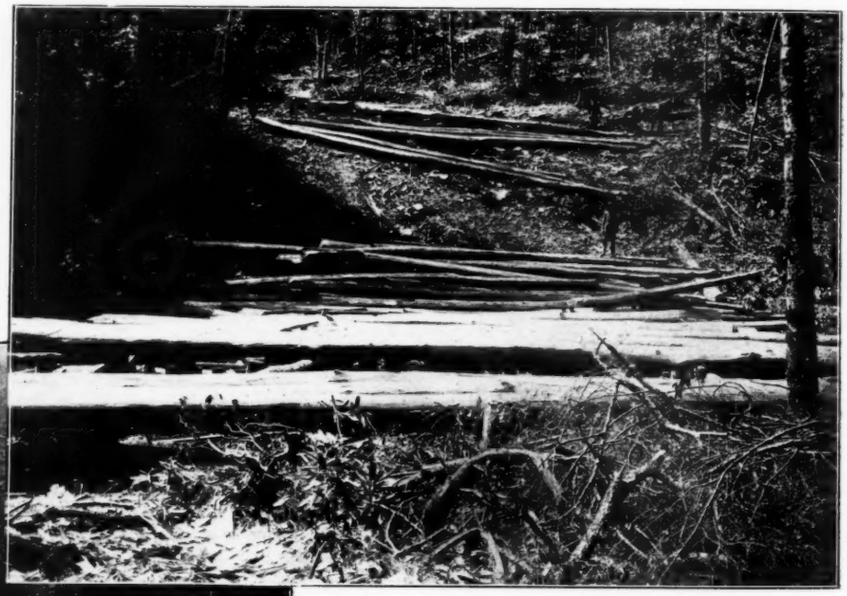
Carl M. Mauseau, who for some time has been assistant general manager of the Duluth (Minn.) Telephone Company, has been appointed assistant general manager of the Northwestern Telephone Company, with headquarters at Minneapolis. Mr. Mauseau, it is understood, will retain his title as assistant general manager of the Duluth Telephone Company.

Manufacturers' Department

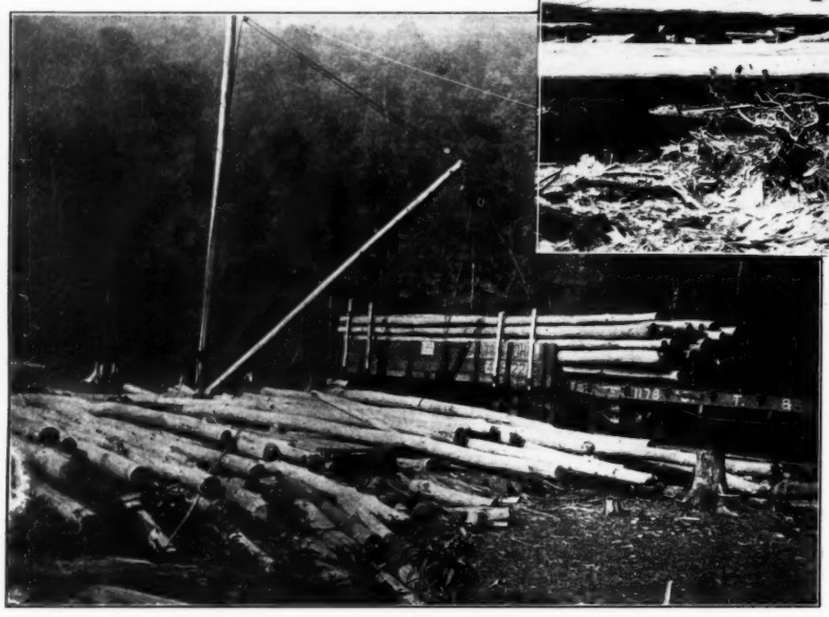
JAMES I. M. WILSON COMPANY.

In April, 1900, James I. M. Wilson and Harry Wilson of Pittsburg formed a co-partnership under the firm name of James I. M. Wilson & Company, as wholesale lumber dealers. Realizing that the chestnut pole business was a good one, they embarked in the same about a year and a half later, starting in a small way by getting farmers to get out what poles they could in the winter time when not farming, and having them ready for shipment when the frost was out of the ground and telephone companies could use them. But this proved very unsatisfactory, as about the time the telephone companies would want the poles, the farmer would be busy tilling his soil, and it would be impossible to get the poles shipped with any degree of promptness.

JAMES I. M. WILSON.



WHERE TREES ARE MADE INTO POLES.



LOADING POLES IN CEDAR FOREST.

The above firm started operations in the pole business in Pennsylvania, but this state had been cut over so much there was practically nothing left but a lot of scrubby chestnut, so they had to look elsewhere for production, going into the uncut fields of West Virginia, making arrangements with a lumberman in that state to do all their shipping. This also proved unsatisfactory, as the shipments were delayed, and it was impossible to carry a stock sufficient for the demand, so this year they started out buying their own tract and putting their own men and teams in, in order that they could know and attend to what they were doing. They have produced from their tract alone in West Virginia 15,000 poles this year, the character of the poles being the finest in the market and surpassed by none, they claim. This has proven so satisfactory that by next spring, when the winter snows have cleared away, they will have in stock for immediate shipment 15,000 to 25,000 poles, being one of the largest chestnut pole producers in the country.

The chestnut pole, so the Wilson company claims, is far superior to any other pole on the market on account of its strength, and will hold up the line in the most severe storm. The strength of the chestnut pole is almost limitless, and there have been instances where in a very severe storm the chestnut pole has torn up the ground to the depth in which it was planted without breaking.

The firm of J. I. M. Wilson & Company is now incorporating under the name of the James I. M. Wilson Company, taking into the firm Isaac F. Basley, as secretary, James I. M. Wilson being its president, and Harry Wilson its treasurer.

The telephone companies of western Pennsylvania, it is claimed, will use no other pole but the chestnut, except in rare cases, and they are now using a composition of pine tar which they are putting on the butts, the use of which makes them last almost indefinitely.

In this connection the experiments in seasoning and preserving telephone poles, now being carried on by the United States bureau of forestry, are of interest, and the results already attained will prove of value to all pole users. During the past year the forest service has been conducting this investigation. Fifty green poles were furnished every month to each of five experimental stations. Each pole was exposed to the open air, and was weighed every month until it ceased to lose weight. The rate at which weight was lost showed the rate of seasoning in different months. After one year of seasoning, preservative treatment was applied to the poles, beginning last spring. Several different

preservatives were experimented with. Most of the poles at two of the stations—Wilmington and Pisgah, North Carolina—were treated by applying the preservative with a brush. In a few cases a cap or plate was fitted to the butt of the pole and creosote forced in by a pump, but with unsatisfactory results. Both chestnut and juniper poles were treated by these methods.

To test the efficacy of the treatment as a preventive against decay, these poles, carefully numbered and labeled for identification, have been set in an experimental section between Savannah and Meldrim, Georgia. Each treated pole is set between a green and a seasoned pole, so that the absolute and relative values of the different preservatives will be fully tested.

The third method of applying the preservative is that from which the best results are expected. This method was applied to chestnut poles only. At Dover, New Jersey, in addition to the external applications, a number of seasoned poles were treated in an open tank, constructed to permit the treatment of thirty-foot poles inclined at an angle of twenty degrees. In this tank the poles are boiled in creosote for several hours. They are then either shifted to a tank of similar construction containing cold creosote, in

CREW OF EMPLOYES IN J. I. M. WILSON COMPANY'S YARDS.

which they stand for several hours, or are left in the hot oil to cool down gradually. This treatment covers the pole with creosote to a distance of from eight to ten feet from the butt. Up to this time a penetration of one inch and an absorption per pole of thirty-five to forty pounds of creosote have been obtained. Changes in the method of operation are almost daily increasing the depth of penetration. This is the first apparatus of this character constructed in the United States for impregnating the butts of telephone and telegraph poles, and the success which is being attained with it indicates the practicability of its widespread adoption in commercial practice.

Since the life of such poles is determined by the decay at the ground line, only the section from the bottom of the pole to about two feet above the ground needs to be treated. Creosote is expensive, and if the whole pole must be treated the added years of service may not compensate for the outlay—it may be cheaper to use two untreated rather than one treated pole. But if an effective method of treating not more than eight or ten feet of a pole can be found, there is every reason to expect that treatment will prove profitable to the users of poles as well as an economy of forest material.

A NEW SELECTIVE LOCKOUT TELEPHONE.

The Nagel-Collins Manufacturing Company of Chicago is manufacturing for Dr. P. T. Geyerman of Brewster, Minnesota, a new selective lockout telephone. This device is especially valuable on toll and farmers' lines, where privacy is desirable, also in exchanges where party lines are used. The system is operated without the aid of a "Central," each subscriber making his own selection by setting the dial on the number desired, this dial operating a contact spring working through electro magnets, which automatically engages in a second tooth dial, on which are two contacts which send the impulses over the line and sets the dial of the telephone number called, ringing its bell until the receiver is taken off the hook. A double set of contact springs, opened and closed by a dog, or ratchet, on the main dial, controls the lockout, insuring a quiet line, no other party being able to call or listen on the line while two telephones are in service. Upon hanging up the receiver the dials will turn to "o," and the line will automatically restore itself. These instruments are now operating successfully in the Brewster telephone exchange, and are found invaluable.

"COPPER GOSSIP."

In its last issue, "Copper Gossip," published monthly by the National Conduit & Cable Company, says:

"There has been an exceedingly active market in copper lately, with demand from domestic sources specially pronounced. Europe also continues to take a lively interest in the trend of affairs here, but as far as recent buying is concerned this country occupies the first rank. Orders have poured in from home consumers in rapid succession, and the enormous size of the aggregate demand since the 10th instant is clearly indicative of an excellent state of trade now under way. The general tendency of events in connection with copper and the underlying tone all point with emphasis to the remarkable strength of the situation. Notwithstanding the heavy tonnage disposed of during the past ten or fifteen days, prices have not been sharply advanced. Indeed, there does not appear to be any disposition to raise prices to an unreasonable level, or put quotations at what might be considered abnormal heights.

"The important developments taking place in copper may possibly stimulate the market later, as it cannot be expected that a commodity in such urgent request as copper is will continue to remain at a stationary value for an indefinite period. A wonderful outlet for raw copper exists, and in spite of the large current production there is little chance left for the metal to accumulate in dangerous quantities. Europe and America are putting in their claims for monster supplies which are absolutely necessary for legitimate trade needs, and production is being closely pressed by consumption.

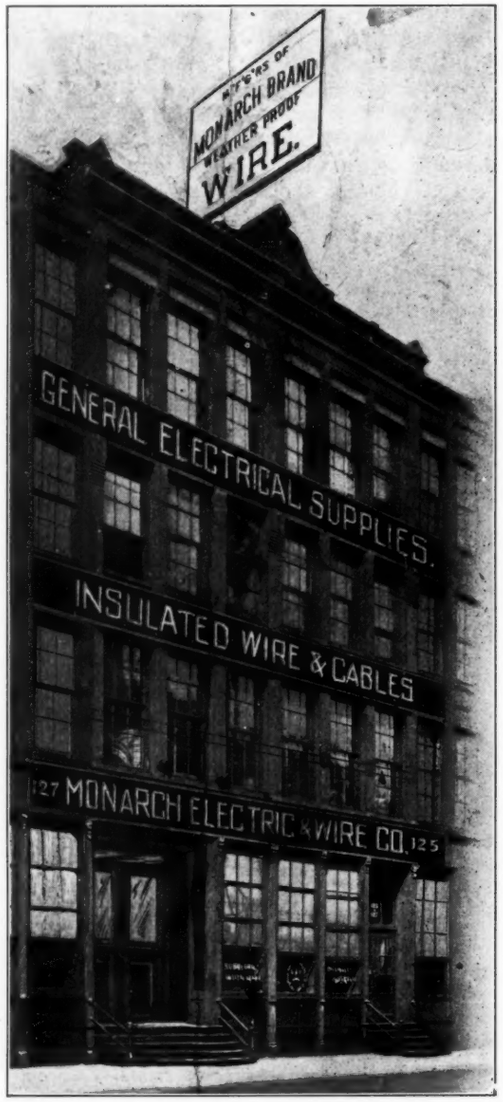
"The conviction is growing that the market is in for an extended period of firmness, and no one can carefully study the situation without being impressed with the surprisingly strong position of copper at the different strategical points. As matters look now it would appear to be the part of a wise conservatism to prepare for a hardening tendency before long, as an advance seems the natural thing if demand should take on any further pronounced increase. Sentiment is of the sanguine order regarding the outlook, and if there is no contraction in exports higher prices may be reckoned among the probabilities.

"Exports of copper are the marvel of the year, and for the first six months of 1905 amount to 290,754,240 pounds, as against 255,458,560 pounds for the first six months of 1904, an increase of 35,295,680 pounds. The total exports for the twelve months ending June 30, 1905, amount to 590,222,080 pounds, or within 222,315,187 pounds of the United States production for the year 1904. Under the combined influence of a large domestic consumption and a free export movement the market is strong. The prospective outlook for business in copper and its manufactures is one of exceptional brightness."

THE MONARCH ELECTRIC & WIRE COMPANY.

The accompanying illustrations show views of the Monarch Electric & Wire Company's big establishment at 125-127 South Clinton street, Chicago, together with photographs of several of its leading men. The Monarch Electric & Wire Company is one of the largest and most successful supply houses in the United States. Beginning in a small way five years ago with about 4,000 square feet of floor space, it to-day occupies a large and commodious building, covering 30,000 square feet, and owing to its constantly increasing business has been obliged to rent warehouse space outside. The principles upon which the large business of this house has been built embrace prompt shipment of orders from one of the largest and most complete stocks of electrical goods in the country, and giving the purchaser what he orders. Under no circumstances is a single article allowed to be substituted.

The founder, S. Mankowitz, launched this business in a small way about ten years ago, but owing to its rapid increase, he conceived the idea that there was room for a first-class manufacturer of W. P. copper wire and galvanized strand, as well as for an electrical supply house, and from this small beginning sprang the Monarch Electric & Wire Company, which is to-day known from the Atlantic to the Pacific and beyond the sea as "manufacturers of the celebrated brand of Monarch wires and Monarch strand."



HOME OF MONARCH ELECTRIC & WIRE COMPANY.

MAIN FLOOR.

The receiving department and city sales department occupy a large part of the main floor and by a system inaugurated by them, claim to fill orders more promptly than any other house. The general offices occupy about 3,000 square feet of space on the main floor, divided into departments, special provision having been made for the comfort of out-of-town customers. The remainder of the building is devoted to the large stocks carried by the company and to the manufacturing department.

WIRE.

The factory where the celebrated Monarch brands of wire is made, occupies three large floors, devoted entirely to this particular industry. The fourth floor is devoted to the braiding department. Here a stranger beholds an interesting sight, where hundreds of machines braid thousands of feet of wire daily and hardly an employe is to be seen, owing to the machinery being run automatically. This department is in charge of A. D. Lindsay, who served his apprenticeship with the old Chicago Insulated Wire Company of Sycamore, Illinois, where Mr. Lindsay was born. To him no little credit is due for the efficiency of this department.

THIRD FLOOR.

The third floor is devoted to finishing, compounding, polishing and packing the wire, and here again the observer finds interest in the way the different processes are handled, automatic machinery exclusively being employed on this floor. Here, also, are located the special stranding machines for the manufacture of wire strand, guy wire and cable rope. This department is in charge of Mr. Abram, who came from Cleveland to associate himself with the Monarch people.

SECOND FLOOR.

The second floor is devoted to the stock room, where the finished products of the factory find temporary rest before being shipped to all parts of the world. Here, also, is an automatic measuring machine, a marvel of ingenuity and simplicity. This department is in charge of F. Casey.

ORDER DEPARTMENT.

The purchasing department is under the charge of H. S. Nelson, who for many years was connected with M. B. Austin & Company, and who associated himself but recently with the Monarch company. His thorough knowledge of the supply business ably fits him for this position and his addition becomes a valuable adjunct to the company.

SHIPPING DEPARTMENT.

The department which interests a customer possibly more than any other, is the shipping department, which is divided into city and country branches. William Mueller, who has long been connected with the company and whose efficient knowledge of the electrical business fits him for the position, has charge of the country department and with a corps of several assistants takes care of all the country business. George Lewis, with several assistants, has charge of the city business and pick-up department and the way in which this department is handled is shown by the great satisfaction which customers evince.

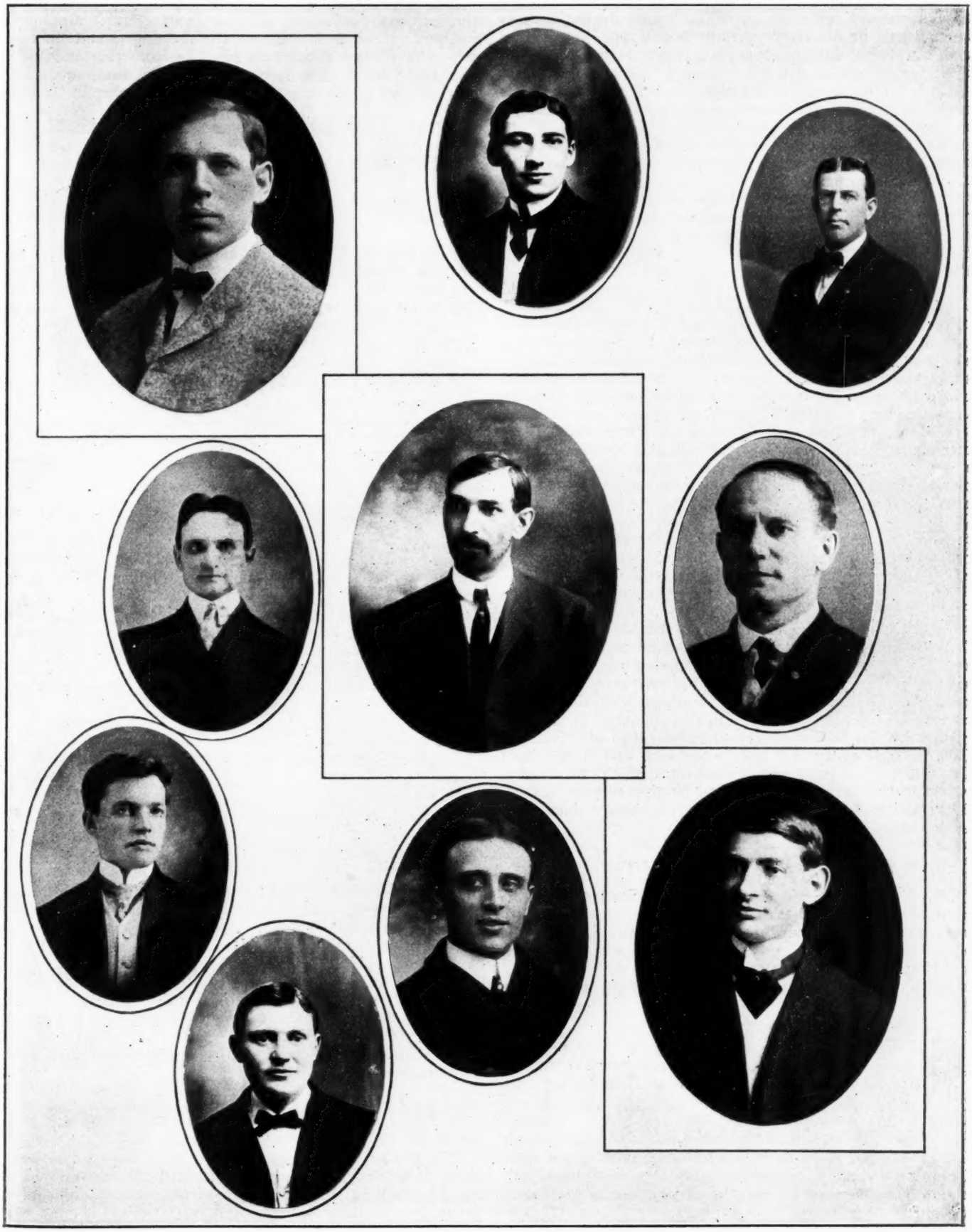
CITY SALES.

This branch of the business is in charge of E. J. Cassin, whose knowledge of the sales end fits him for the position and whose large acquaintance, owing to his amiable disposition, has made for himself hosts of friends.

COUNTRY SALES.

"We want young men" seems to be the great cry in every line of business and the Monarch company seems to be well supplied with the right kind. Among them, none has shown a better knowledge of the duties of his position than E. Kearns. Although a young man, he has shown by strict attention to business that opportunities for progress still exist. The Monarch company is proud of its young men and every one, working hand in hand, is striving to make the company one of the most successful in the business. Mr. Kearns takes care of the trade in Illinois, where his popularity is always on the increase.

A. D. Gillespie, the firm's Indiana representative, is



Louis Schwab.
W. H. Dishong.
E. W. Kearns.
George Lewis.
William Mueller.
S. Mankowitz.
C. A. Kuhlmann.
A. D. Gillespie.
E. J. Cassin.
Henry Schwab.

OFFICIALS, HEADS OF DEPARTMENTS AND TRAVELING SALESMEN OF MONARCH ELECTRIC AND WIRE COMPANY.

another of its young men who has in him all the attributes of a successful salesman, as is evidenced by the success he has had in his territory, where everyone knows him and has found him a congenial, pleasant and successful hustler.

C. A. Kuhlman covers Michigan and Wisconsin and his continual hard work has proven that keeping everlastingly at it brings success.

W. H. Dishong has charge of the office details and accounts and has proven himself capable and efficient in this department.

S. Mankowitz, president of the company, began life a poor boy and by hard work and honesty of purpose, has achieved prominence in the electrical field, being well known by all the large houses in the country. He has entire charge and supervision of the factory.

Louis Schwab, vice-president, is a Chicago product and is a true exponent of the Chicago spirit. Mr. Schwab began his career about ten years ago and by hard and diligent work made his ability recognized. He became director and vice-president of a large smelting company, which position he still holds. Four years ago, with others, he associated himself with the Monarch company and became its vice-president and general manager.

N. Deutsch, treasurer, is a prominent citizen of Chicago, coming originally from Cleveland, and being president of a large smelting company. His eminent ability as a financier aptly fits him for the position of treasurer of the Monarch company.

Henry Schwab, secretary, also is a Chicago product and to him great credit can be given for the efficiency of the company's supply department, he having absolute charge of the same in addition to his being credit man.

The company does a large export business to Australia, South Africa, Hawaiian Islands, Japan and South America.

In conclusion, it may be said that the Monarch Electric & Wire Company is prepared to meet all trade conditions and has provided itself with every possible means to insure success. The concern manufactures an extensive line of specialties, besides being in close touch with the largest manufacturers and wholesalers in this country. It is largely through its proven ability to rapidly and satisfactorily fill orders of every size and importance that it has been able to secure so promising a standing with the purchasing public. Its policy and reputation in this respect will no doube insure future achievements even greater than those in the past.

STANDARD DUPLEX SET.

The Current Electric Company of 52 State street, Chicago, is meeting with excellent success in the manufacture and sale of its Standard Duplex Set, which is made for bridging metallic lines and is designed to give two talking and ringing circuits from one metallic line without disturbance or cross-talk from the duplex circuit to the metallic

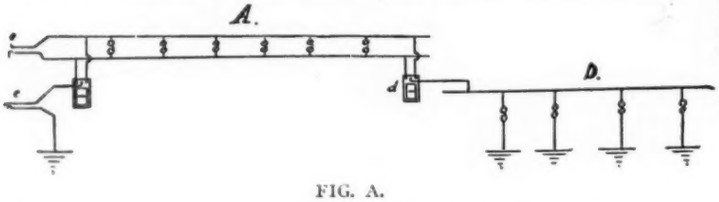


FIG. A.

line or vice versa when both are being used at the same time. It is simple, inexpensive, easy to connect to a line, has no movable parts or contacts to wear out or get out of order, is well protected by lightning arresters, and is guaranteed to give satisfaction. The circuit sketches (with descriptive text from company's circular) illustrate some of its uses:

Fig. A.—An extension or side bridging line can be connected to a metallic circuit at any convenient place by using the standard duplex set, so as to render service absolutely independent of the service on the metallic circuit, that is, if you have a metallic line running out from your exchange, say, ten miles, loaded to its capacity, and there are other

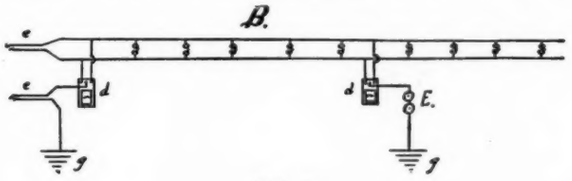


FIG. B.

parties beyond this line who would like telephone service, but you cannot afford to run a line all the way out from the central office to accommodate them, simply connect the duplex set to the outer end of the line, run a single wire to the new subscribers, and operate the extension line the same as though the line ran all the way to the switchboard.

Fig. B.—If you have a subscriber anywhere on a metallic line who would be willing to pay a little extra for private

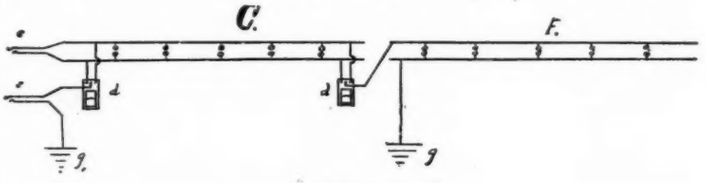


FIG. C.

service, get a Standard duplex set and operate his telephone from a separate drop on the switchboard, the same as though he had a line of his own.

Fig. C.—If you have a heavily loaded metallic line, it would be well to divide it at some convenient place and use it as two separate lines without cross-talk from one to the other when both are being used at the same time, and without extra expense, save the small cost of the duplex set.

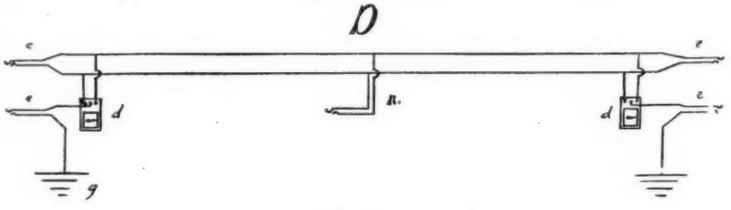


FIG. D.

Fig. D.—Perhaps you may have a metallic toll line, say, forty miles long, over which only one conversation can be carried at a time. By using the Standard duplex set, two conversations can be carried on over this one line at the same time without either interfering with the other. The only requirement to use this instrument for any of the above mentioned purposes is to have an ordinary good metallic line, such as most exchanges now have, and keep it clear of the ground on each side.

The Standard duplex set will be sent on thirty days' trial to reliable purchasers.

CENTURY COMPANY INCREASES PLANT.

The Century Telephone Construction Company, of Buffalo, New York, has just completed the installation of a common battery, lamp signal, multiple, switchboard equipment, having immediate capacity of 600 lines, in the exchange of the Princeton Telephone Company, at Princeton, Indiana. This equipment also includes toll position.

The Century company also has recently shipped switchboard equipments to the Southern Cayuga Tele-

phone Company, for Poplar Ridge and Aurora, New York; West Lake State Telephone Company, Skaneateles, New York; Conewango Telephone Company, South Dayton, New York; Canisteo Telephone Company, Canisteo, New York; Plattsburg Overland Telephone Company, Plattsburg, New York; Wellsville Telephone Company, Wellsville, New York.

The company also received orders for switchboard equipment to be shipped to the Patrons' Telephone Company, Fulton, New York, and the Patrons' Telephone Company, Lamson, New York.

This company at the present time is making extensive additions to its factory so as to take care of the enormous increase in its business.

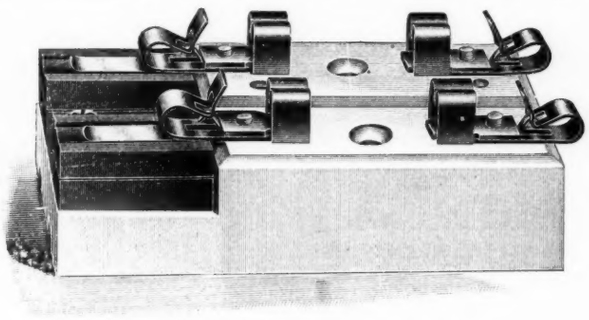
LIGHTNING ARRESTER BLOCK NO. 87.

One of the numerous new lightning arrester blocks, that are always being added to the regular list of the American Electric Fuse Company of Chicago, is No. 87.

The base is of extra heavy porcelain, grooved and slotted so that all wires are concealed.

The fuse clips are the new spring clips originated by the American Electric Fuse Company, and are guaranteed to always make good contact.

The binding posts are the Fahnestock variety, thus insuring a perfect connection, and one that can be easily and quickly made.



LIGHTNING ARRESTER BLOCK NO. 87.

The carbons are large and firmly held in place by a stiff german silver spring, thus insuring a perfect discharge surface.

Viewed from all its points, this is claimed to be one of the most perfect lightning arrester blocks ever placed on the market, and the American Electric Fuse Company can well be proud of No. 87. One large company ordered 5,000 as soon as the sample had been submitted.

ANDREWS METAL FURNITURE FOR TELEPHONE EXCHANGES.

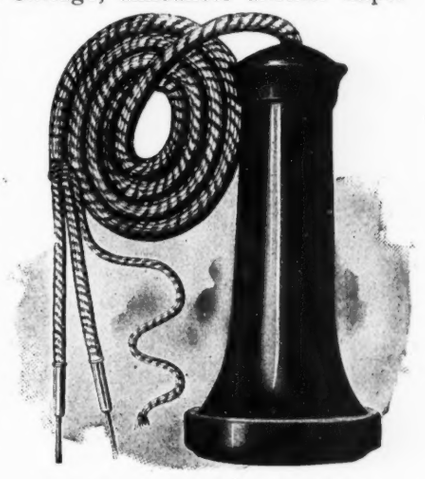
Nothing in the way of furniture for telephone exchanges, offices, confectionery or drug stores, has ever achieved the fame and popularity of Andrews Metal Furniture. Wherever you go you see it; wherever you see it, it is held in the highest esteem. It is light, convenient, cleanly and durable, and is peculiarly adapted for use about telephone exchanges. The Andrews equipment consists of stools, tables and chairs.

Andrews metal furniture is made of Bessemer spring steel rods, twisted and interwoven (imitating kinds are not interwoven, as this vital, fundamental principle is protected by strong patents), giving it the greatest rigidity and strength. The metal work is plated in Japanese copper finish, giving a beautiful effect, as will be noted from the illustrations given in this firm's advertisement in the advertising section of TELEPHONY. Andrews metal furniture is light and graceful, yet the strongest furniture made, as its construction is such as to make it practically indestructible. Its beauty is in striking contrast with ordinary stools, chairs and tables. Andrews metal furniture adds tone and smartness to any exchange where it is used, and the operators' stools are particularly handsome and comfortable.

When you find the name "Andrews" on a piece of metal furniture you are safe in buying it, for the A. H. Andrews Company warrants its goods for ten years. Andrews metal furniture is the original kind, whose good points and utility have made metal furniture famous. The firm's latest catalogue, beautifully illustrated in colors, will be furnished upon request. Address the A. H. Andrews Company, 174-176 Wabash avenue, Chicago.

ILLINOIS SPECIALTY MANUFACTURING COMPANY'S RECEIVER.

The Illinois Specialty Manufacturing Company, 97-101 South Clinton street, Chicago, announces another important improvement in its very popular and successful Double-Pole Telephone Receiver. The new improvement consists of a spring terminal in addition to the customary set screw, both of which, combining upon the terminal wire, effect a double contact. The connecting spring being of German silver affords the best possible contact.



I. S. M. COMPANY'S RECEIVER.

All of the Illinois Specialty Manufacturing Company's receivers are guaranteed to be of the best material and workmanship, although exceptionally reasonable in price. The manufacturers desire to emphasize the fact that, no matter how cheap they may sell their goods, the quality must always remain of the highest grade. The I. S. M. Co. receiver is especially simple, durable and efficient. It is guaranteed to always retain adjustment and to give uniformly satisfactory service. This receiver can be had in any style of shell. Prices are largely governed by the quantities furnished, and all interested parties are requested to write the firm for more detailed information.

DENIO GENERAL ELECTRIC COMPANY'S APPARATUS.

The Denio General Electric Company, Rochester, New York, is distributing an interesting folder, descriptive of its patented telephone fire alarm, and other protective signaling apparatus. The folder states that these devices have been tested, examined and approved by some of the best electrical engineers of the country. The company lays particular stress upon the value of its telephone fire alarm, on account of the amount of protection it affords. It points out the cost to subscribers as very low for the reason that a signal box can be installed for a nominal sum. It also states that if thermostats are required, the only additional expense is that of the wiring and material. The Denio system can be installed in any building having a central energy telephone.

THE WILLIAMS TELEPHONE AND SUPPLY COMPANY.

Among the successful and recognized leading telephone manufacturing concerns in the United States, the Williams Telephone and Supply Company, 73-79 Central avenue, Cleveland, Ohio, occupies an enviable position, and its steadily growing business attests to the stability and popularity of its product. The Williams Telephone and Supply Company is officered by W. C. Hine, president, and C. W. Hunt, secretary and treasurer. It is the successor to the Williams Electric Company, one of the oldest telephone manufacturing companies in the field, having been organized by Joseph A. Williams in 1897, in the early days of the Independent movement. It, therefore, can justly lay claim to being a pioneer among the Independent telephone manufacturing establishments of the country.

C. W. HUNT.

The Williams Telephone and Supply Company has a very large business among farmer and rural lines, as well as among exchange companies, and its apparatus under the most severe tests has proved highly satisfactory, demonstrating its merits and the truth of the manufacturers' claims under all conditions. The company's export business has grown steadily, and Williams' apparatus is now in use in seventeen foreign countries.

The Williams Telephone and Supply Company was incorporated in October, 1903, and took over the factory and business of the Williams Electric Company at that time. The company was then located at 80 to 88 Seneca street, Cleveland. It was not long before the factory space became too crowded and larger quarters were required. The company moved into its present commodious factory in July, 1904, and now has a modern and up-to-date plant in every respect, being equipped with the latest designed machinery, to expedite the manufacture of high-grade telephone apparatus. Several views of the Williams factory are shown on the following pages, as well as views of the company's general offices, accounting department, etc.

The factory of the Williams Telephone and Supply Company is in charge of William Kaple and W. R. Horning, engineers of marked ability and wide experience.

C. W. Hunt, secretary and treasurer, is the practical head of the company, and its success is very largely due to his wise and able management. His business ability is well known among the telephone fraternity, and his wide knowledge of the needs of the telephone field makes him especially valuable in his present position. Mr. Hunt was born

PLANT OF THE WILLIAMS TELEPHONE AND SUPPLY COMPANY.

VIEWS IN FACTORY OF WILLIAMS TELEPHONE AND SUPPLY COMPANY.

VIEWS IN GENERAL OFFICES OF WILLIAMS TELEPHONE AND SUPPLY COMPANY.

in Canfield, Ohio, in the year 1864, and received his early education in Canfield. He has been identified with manufacturing and commercial enterprises for the past twenty years. In Cleveland he is regarded as a business man of sterling qualities, and stands high in the commercial circles of that city.

The company manufactures a complete line of telephone equipment, making a specialty of rural line switchboards and bridging telephones. Its new simplex relay switchboard is meeting with distinct favor among companies all over the United States. Another new piece of Williams apparatus, a valuable switchhook, which, in point of popularity, is rapidly coming to the front. This switchhook has genuine platinum contacts and is proof against grounding or short-circuiting. It has four contacts and no pivot connections, four springs being used which are readily connected to the talking and ringing circuits, and it is so constructed as to do away with the use of the lifting spring, the hinged joint or the frame as a part of the electric circuit, thereby eliminating all possibility of loose contacts, which in that position would be difficult to locate. The platinum points used furnish a positive electric contact in all climates and under all conditions of moisture and temperature. The springs are so adjusted that the hook is perfectly balanced. The hook is self-contained and can be taken out for any purpose without disturbing the other parts of the telephone. The lifting spring is of tempered steel, which is always uniform in its tension. No pains or expense have been spared to make this hook what it is pronounced by experts to be—*electrically perfect;* and this is entirely in keeping with the purpose of the Williams company, which aims at all times to keep its apparatus up to the highest standard of excellence.

The Williams company recently has issued a little book on telephone line construction, which will be sent to all who may be interested in the building of rural telephone lines who ask for it. Present indications for fall business are unusually good, and the officers of the company state that 1905 will be the banner year in its history.

ANNUAL MEETING OF THE NATIONAL BATTERY COMPANY.

The annual meeting of the stockholders of the National Battery Company was held August 4, at the general offices of the company in Buffalo. The old board of directors was continued unchanged, and the following officers of the company were elected:

John R. H. Richmond, formerly treasurer, was elected president of the company; James MacNaughtan, formerly vice-president, was continued in the same office; Ralph Kimberly, formerly secretary, was appointed to fill the offices of both secretary and treasurer, the latter office being the one formerly occupied by Mr. Richmond.

Mr. Richmond and several associates have taken a large block of the increased capital stock, which will be used in the further extension of the business.

R. L. Coleman, formerly president of the company, was elected chairman of the board of directors, and he still retains his large interest in the company; James MacNaughtan, under whose management the company has been brought to its present position of strength and activity, was reappointed general manager.

The company now ranks second in this country in the electric storage battery business. The results accomplished during the past year have encouraged the stockholders of the company beyond their expectations; extensive plans for further development have been made; the field of activity will be broadened, and it is confidently expected that the results for the coming year will more than justify the company in a continuation of the progressive policy that has been inaugurated.

The company has a very fine organization, the sales manager being both an electrical and mechanical engineer, with extended commercial experience, and the factory manager being a thoroughly trained technical man, who has been connected with this company from its inception. Other departments of note are the engineering, construction and publicity departments, all of which are managed by men carefully selected for their ability and training in their particular lines of work.

CADIZ ELECTRIC COMPANY IN NEW PLANT.

Last spring the directors of the Cadiz Electric Company of Cadiz, Ohio, saw that the rapid growth of the company's business would make large and commodious quarters an imperative necessity. A large tract of land was purchased along the railroad, plans and specifications drawn up and the contract let for a large factory building. The building was finished August 1 and the company is now moving its plant into the new quarters. When the new machinery has been added it will have one of the most complete manufacturing plants of the kind in the country.

The building is two stories in height, giving two big floors. The first floor will be used as a machine room and the second floor for the assembling departments. This plan brings the assembling departments close to their source of supply, while effectively preventing the oil and dust from the machines reaching the finished products.

Cadiz is located in one of Ohio's richest natural gas fields and the cost of fuel is thus greatly reduced. The plant will be operated with gas engines and this ideal fuel will enable the company to produce the most perfect steel magnets, of which they will use vast quantities for their farm telephones. The location of the factory so near to Pittsburg, the world's great steel and iron center, enables the company to secure its raw material quickly and with a great saving in freight.

Cadiz is also located in one of the finest oak timber

tracts in the world and the company will be in a position to make its own cabinets. Having first choice of the wood, cabinets of exceptional quality can be used. A finer location for a telephone factory could not be found. The shipping facilities are exceptional. Six trains per day carry freight to the main line, where it is taken on through trains. It is, therefore, impossible for freight to be delayed, as is the case in large cities, where it is frequently lost for weeks at a time among hundreds of cars in the large terminals.

The company with its new facilities is now in a position to supply its patrons with exceptionally fine equipment and prompt shipments are assured.

NEW CONTRACTS FOR DEAN COMPANY.

The Dean Electric Company of Elyria, Ohio, has recently secured a contract from the Adirondack Telephone Company for a complete common battery multiple switchboard equipment for its Potsdam, New York, exchange. It is to be a duplicate of the equipment which the Dean Company is completing for the Adirondack Company's Malone, New York, exchange, and is to consist of a multiple, lamp-signal switchboard of 1,200 lines ultimate capacity, fitted with the new Dean four-party selective ringing apparatus, including individual indicating ringing keys in each cord circuit.

The present installation will consist of two three-position switchboard sections, the necessary distributing frames and a complete power plant. The ringing current for the four-party line and regular line circuits is to be furnished by a duplicate set of battery pole changers, which are a new Dean product, simple in design and said to be very efficient in operation.

The advent of this new battery pole changer, with its low first cost and efficient operation, should make the Dean party line system more popular than ever. The necessity of outside electric power is obviated, as primary power can be economically used for the purpose. This allows the four-party metallic or eight-party Dean selective ringing systems to be used in small towns where commercial electric circuits are not available.

The Medina Home Telephone Company of Medina, Ohio, has recently placed an order with the Dean company for a complete modern central office equipment. The switchboard is to be the common battery, lamp-signal, multiple type, arranged for 1,200 lines, and at present will consist of two three-position sections. The new Dean four-party selective equipment is to be furnished, individual indicating ringing keys being provided in each cord circuit for this purpose. Ringing current for the four-party line and the regular line signalling is to be derived from a duplicate set of the new Dean battery pole changers.

NEW EQUIPMENT FOR DECATUR, ILLINOIS.

An eminently practicable and money-saving method of re-equipping the older established magneto exchanges is being put into practice by the Macon County Telephone Company, of Decatur, Illinois. The plant is being equipped with a full multiple lamp-line signal switchboard and all necessary auxiliary equipment, including storage batteries, charging and ringing machines, power board, and protective devices.

The unique feature lies in the fact that while the central office equipment is especially arranged for magneto service in connection with the old construction, containing many grounded and common return circuits, it can be changed to full central energy at any time when the outside construction is made metallic and the telephones are rebuilt or replaced with central energy instruments.

The re-equipment of the central office, besides affording a much more rapid and efficient service to the subscribers, will result in a direct financial gain to the operating company, as the board can be operated at a saving of fully twenty per cent on operator hire, to say nothing of saving in cost of maintenance and repairs.

The entire apparatus is being furnished by the International Telephone Manufacturing Company of Chicago and is of its latest design and manufacture. With this class of equipment installed, it will be safe to estimate but a very small percentage for depreciation, and with the direct saving shown in cost of operation, a handsome percentage of increase in earnings undoubtedly will result.

ALBERT J. COX, PURCHASING AND DISTRIBUTING AGENT.

Telephone companies desiring the services of an efficient, experienced and judicious buyer of first-class apparatus, and one who is most advantageously situated at the center of the telephone manufacturing industry, are invited to correspond with Albert J. Cox, who has recently entered the Independent telephone field as a purchasing and distributing agent. His offices are at 1214 Stock Exchange building, Chicago.

ALBERT J. COX.

For some fifteen years Mr. Cox was connected with the Western Electric Company, and in this concern secured a thorough knowledge as to the best possible means of buying, as well as an acquaintance with standard specifications and the proper places to secure all materials needed in the telephone field. From his long acquaintance in the field, and his thorough training and experience, Mr. Cox is not only enabled to give each customer prompt and particular attention, but being constantly in touch with the markets, he keeps thoroughly posted on all fluctuations and changes in prices, and can give each client the fullest benefit of same.

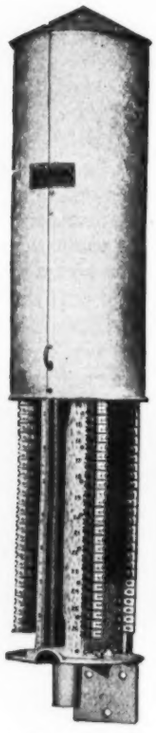
It also is his intention to keep his clients advised as to present conditions and future probabilities regarding the markets for telephone supplies, and to suggest when the time is opportune for the contracting of various items which commonly fluctuate greatly in price. His system of consolidating the purchases of a number of clients throughout the Independent field will also enable him to command the very best prices which the market can afford, and to meet the sharp competition of to-day, both in quality and in price.

It undoubtedly will impress our readers that a system very much like this has been a great benefit in time past to the various Bell companies, and has placed the Independents at a disadvantage to that extent. Mr. Cox's plan and his long experience in the Bell field will now enable him to give Independent companies, which contract with him for their buying, an equally good showing. Telephone companies in need of services of this kind will find Mr. Cox thoroughly acquainted with all of the proper specifications,

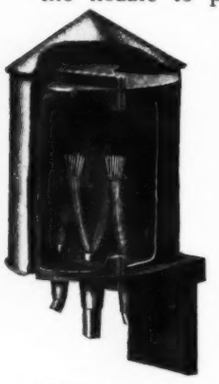
and by acquainting him with their needs will be saved a large amount of detail and worry, to say nothing of important economies in expense.

COOK'S SELF-SOLDERING NOZZLE.

One of the novel features of Frank B. Cook's junction box is the funnel-shaped self-soldering nozzle herewith illustrated. One cut shows the nozzle with the solder before the cable is placed in position, and the other cut shows the cable soldered in place in the nozzle.



TYPE S. W. TERMINAL.

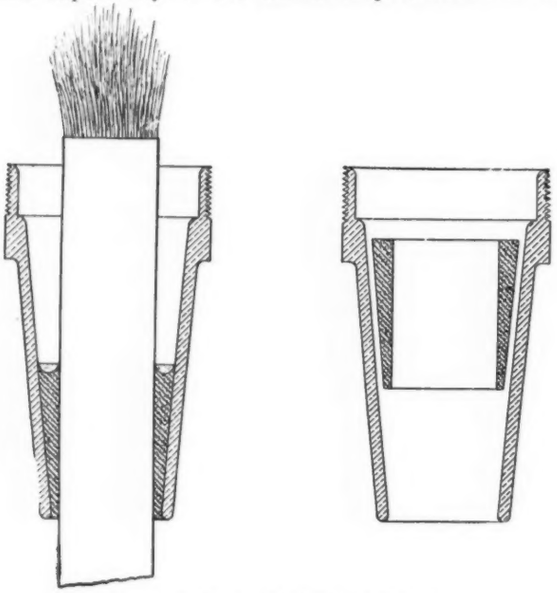


JUNCTION BOX.

In using the self-soldering nozzle, the lead cable sheath must be scraped bright and clean just before soldering. The necessary amount of solder and flux is contained in each self-soldering nozzle, and to solder the cable to the nozzle it is necessary simply to apply a blow torch to the outside of the nozzle, first wrapping tape or cloth around the bottom of the nozzle to prevent the solder from running out.

A great advantage claimed for the self-soldering nozzle over the old wiped joint is that skilled labor is not required to form the joints. Very few telephone men, particularly in the smaller towns, are expert plumbers, and the task of making a perfect wiped joint is no simple one.

Cook's self-soldering nozzle is warranted to be an antidote for all troubles with wiped joints. All nozzles are made of brass, heavily tinned. Mr. Cook claims that the superiority of the funnel-shaped nozzle is due to

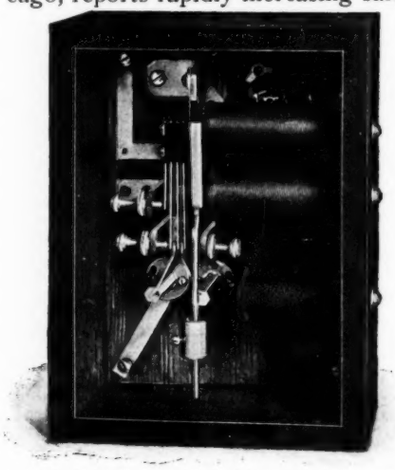


COOK SELF-SOLDERING NOZZLE.

the fact that the solder flows down the nozzle and around the cable sheath more readily and more evenly than in the straight tube. These nozzles are furnished with all Cook terminals, as well as with the junction boxes.

STANDARD RINGER OR POLE CHANGER.

The Current Electric Company of 52 State street, Chicago, reports rapidly increasing sales and universal satisfaction with the Standard Ringer or Pole-Changer. It is simple, compact and very well built, and parties interested in power generators for switchboard use should investigate it before purchasing. The manufacturers claim that it has several unique features not found in other pole-changers, and is sold at a price within the reach of everybody.



INTERIOR VIEW OF STANDARD RINGER.

The accompanying illustration shows the interior view of the ringer. The pole-changing contacts are operated directly from the dry battery by the two coils shown at the top in the illustration, which are carefully wound with the smallest silk-covered magnet wire made, containing about 40,000 turns. The resistance and impedance of the circuit are very righ, thus making the operating expense less than with the Edison primary battery, it is claimed, besides disposing of the inconvenience of having two batteries to keep up, especially one composed of acid, etc., to give off gas and probably to spill occasionally.

The entire mechanism is built on the inside of a highly finished quarter-sawed oak case, with the binding posts and switch on the outside. There is no glass to remove or get broken, and it will work perfectly hanging on the wall or lying in a horizontal position. Its outside dimensions are: Length eight inches; breadth, six inches; height, four inches; weight, 3½ pounds.

The manufacturers will send this pole-changer to reliable purchasers subject to thirty days' trial, fully guaranteed to work perfectly on all alternating and direct pulsating current ringing.

All inquiries by mail will have prompt and careful attention.

BAIRD SECRET-SERVICE TELEPHONE SYSTEM.

The Secret-Service Telephone System, made by the Baird Manufacturing Company, of 3 Michigan street, Chicago, is gaining favor every day. Many companies have shown their faith in this system by installing it. The fact that this system has been in operation in many telephone exchanges throughout the United States for periods ranging from one to five years, and in every case has given such satisfaction that the company is constantly receiving repeat orders for additional equipment, is an evidence of its practicability.

The service rendered by this system is so far superior to the old party-line system service that it is said to be an easy matter to obtain higher rental rates without the subscribers raising any protest.

To convert standard bridging telephones into secret-service instruments that will furnish the same advantages as the complete lock-out and selective ringing telephones, it is only necessary to connect the No. 11 attachment. This can be done in about ten minutes by anyone familiar with the subscriber's instrument circuits.

This system is said to be an unqualified success, and the

Baird company declares it will well pay telephone companies to install it on their party lines.

THE MURDOCK "SOLID" RECEIVER.

The Murdock "Solid" Telephone Receiver has become a standard and staple piece of apparatus in the telephone field. Since this device was first introduced, it has achieved a very favorable and substantial reputation among the believers in first-class goods, and its inventor, William J. Murdock of Chelsea, Massachusetts, has let no opportunity pass to improve and perfect every detail, tending to make this the finest possible specimen of the telephonic art.

We present herewith an illustration of Mr. Murdock's Exchange Type "Solid" Receiver, fitted with the new reinforced cap. The magnet is made of the highest grade magnet steel. Mr. Murdock makes the following claims in behalf of his "Solid" receivers, all of which are of the bipolar type:

"The case will not break.

"The magnets and binding posts will not loosen.

"The binding posts are strong and will not turn or break.

"The receiver is always in proper adjustment.

"The receiver is electrically and mechanically perfect.

"Silk covered wire is used on the spools.

"The magnet is made of the best magnet steel.

"The diaphragm is flat and is of the proper thickness to give best results.

"The spools can be removed and rewound in case of burning out.

"The workmanship and appearance of the receivers cannot be excelled."

Additional information regarding the Murdock "Solid" receiver is furnished by Mr. Murdock in his printed matter, as follows:

"At the time the 'Solid' receiver was invented (August 14, 1900) manufacturers of telephone apparatus were trying to produce a receiver that would stand the hard usage to which a telephone receiver is subjected. They were constantly troubled with the breaking of the shell, with the loosening of screws and parts which would cause the receiver to lose its adjustment. Many different kinds of adjustable receivers were made, and abandoned after we had proven that the adjustable receiver was not practicable and that the only receiver, commercially right, was one in which the magnets and pole pieces were held rigidly at the proper distance from the diaphragm seat. In the 'Solid' receiver these defects have been remedied. The metal parts consisting of the magnets, pole pieces and binding posts connections are molded solidly into the case, making the case one solid piece, thereby giving an instrument that is not only practically unbreakable, but one whose adjustment is absolutely unchangeable. The 'Solid' receiver is the easiest receiver to repair in case of burn out, as it is only necessary to remove the spools by taking them from the pole pieces, rewinding them and replacing them. With the hollow case receiver it is necessary to take the receiver entirely apart and it is almost impossible to replace these parts and get the adjustment perfect. The fact that hollow case receivers are continually breaking and losing their adjustment is enough to satisfy any person using a telephone that the 'Solid' receiver is superior in all respects to any other telephone receiver made. The saving made by the use of the 'Solid' receivers by a telephone exchange will help greatly toward paying dividends for the company."

Mr. Murdock has recently opened a western office at 1214 Stock Exchange building, Chicago, where orders will be promptly filled and all desired information given.

THE TWENTIETH CENTURY WALL DIRECTORY.

The illustration presented herewith shows one type of the Twentieth Century Wall Directory and Register, which is now being offered to the trade by the Mail Order Manufacturing Company, of 91 Illinois street, Chicago. This directory is made in three styles: The Limited Wall Directory, the Revolving Wall Directory and the Revolving Stand Directory. It is adaptable to a number of uses in the commercial world, and can also be very economically employed about the home. Many merchants are using these directories in which to keep a list of the parties on whom they have most frequent occasion to call. Wholesale houses are using them extensively for price lists and indexing purposes. Telephone companies in particular can employ a device of this kind to exceptional advantage in a number of ways. One of these, where the directory is placed upon the switchboard, enables operators to refer at a second's notice to the numbers of any new subscribers who may be added to their exchange from day to day. It is also coming into common use among the smaller village exchanges and rural systems of the country, taking the place of the printed directories, which are necessarily subject to frequent changes, necessitating the printing of new lists.

One of these registers will last a lifetime, and all changes desired can be made at a moment's notice, consuming barely the time necessary to remove one slip and insert another. This enables subscribers to keep their directories strictly up to date each day. Whenever any changes or additions are made, all that is necessary is for "Central" to call up subscribers and advise them of the changes, which they can readily make for themselves in very short time. These registers are made in six different sizes, ranging from 75 names to 450 names, and any of the smaller sizes can be increased by the addition of extra panels. The six regular sizes vary in price, according to capacity. Telephone companies desiring to purchase same for the benefit of their subscribers will find it economical to do so.

Telephone men who desire to act as agents for this register in their respective localities, will also do well to correspond with the Mail Order Manufacturing Company, and secure terms. Already quite a number of wide-awake telephone men are making a neat sum "on the side" by selling this article to hotels, business houses and residences, in all of which it will be found a very attractive, convenient and economical device.

MAKES PAPER SLEEVES AUTOMATICALLY.

One of the most interesting sights at the factory of the American Electric Fuse Company is its new device for making paper sleeves. This new machine cuts, pastes and rolls the paper into thousands of paper sleeves each working day. They are afterward cut the required length, assorted and packed in paper boxes ready for shipment. Since the Fuse company's removal to its new plant at Muskegon, Michigan, and the installation of new and modern machinery throughout, it is in shape to turn goods out on time, and all orders will be shipped promptly.

Nicholas Party-Line Telephone Selector

THE following inquiry and answer appeared in the August number of TELEPHONY:

"As an interested reader and subscriber to your magazine, I should be pleased to have you describe in your paper one or all of the party lock-out systems, such as the Meinama, Stromberg-Carlson Company, and that made by the Baird Company. None of these concerns explain or show diagrams of their systems, hence how is one to determine their relative merits? A superficial description of its general operation and no circuits is of no value in such cases.

"M. R. C."

"I am unable to help you in this matter. If any of our readers can come to the rescue I would be glad of it. If the companies had the proper spirit they would give you the information desired. This refusal on such subjects, to Independent operators, is detrimental to a good cause.

"J. C. KELSEY."

From the tenor of the above we know the Nicholas Telephone Selector Company would have been included in the inquiry if we had been in the field long enough to have attracted the attention of the writer. Mr. Kelsey appeals to any of his readers to "come to the rescue," so we feel we have a double right to be heard. Then again, this journal has always been most liberal in the use of its pages to

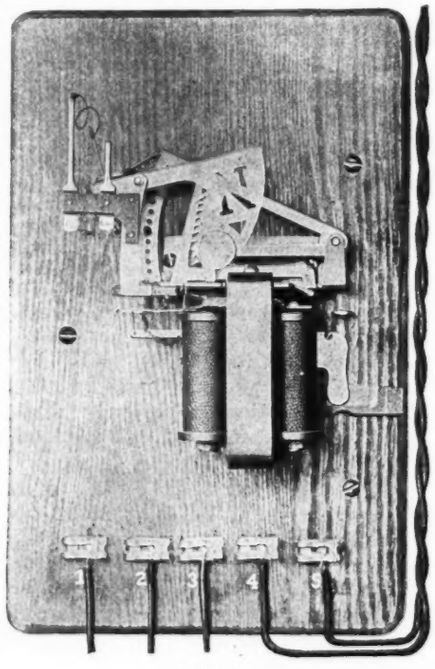


FIG. 1.

every interest of its readers and patrons. In speaking of our apparatus we make no apology for the use of the personal pronoun, as we leave other manufacturers to discuss the merits of their devices and run their own "circuits."

Edward E. Clement, the patent critic of this journal, who writes in such an interesting and instructive manner, has good reason to be felicitous and sometimes sarcastic, as he reviews the great number of patents of this nature. On the other hand he writes as follows, in the last number of TELEPHONY.

"I feel keenly that those who do not make successes; who after all are distinctly responsible for the great things that come as a boon to the world. * * * Their earnest efforts have the dignity that earnestness confers, not only pointing out paths to avoid, but actual hints to those of success."

We applaud these sentiments and all the "earnest efforts" of those who have helped pave the way and advanced telephone interests up to the present time. It has been said "five hundred and seventy-nine patents have been taken out on selectors." Do you wonder that Mr. Clement is apt to poke fun and joke about them at times? To our mind this great number indicates a large and unsatisfied demand for something of this kind to meet an evident need. Our

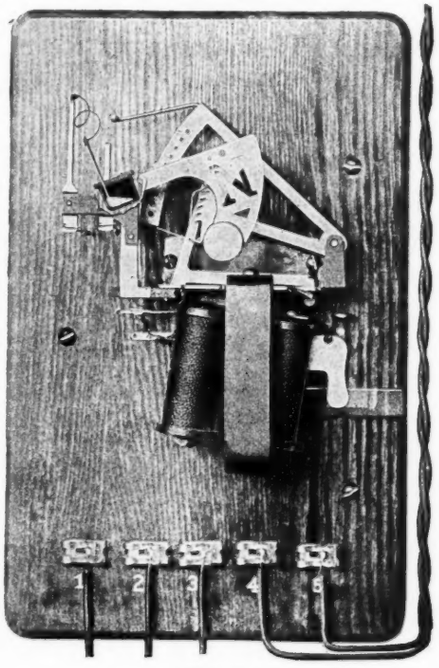


FIG. 2.

inquirer is seeking information that seems to be hard to obtain. We shall endeavor to aid him as far as we can.

In discussing the selector question, these devices must be divided into two classes: Metallic and grounded systems. It is safe to say that fully 95 per cent of the patients that have been taken out have been those of the latter class. We certainly can be excused from even attempting to describe in the space allotted to us, any feature of them, more than that they have to have a third wire or ground, to complete the circuit for ringing, and cannot operate on a bridged, ground system. In the former class, of which the Nicholas Telephone Selector is the only one on the market, are those of very complicated mechanism, including push buttons and short-circuiting devices, of very doubtful efficiency, that have never proved commercially successful.

The inquirer says: "How are we to determine their relative merits?" As the subject has now been opened up, we will endeavor to enlighten him, and help our friends, Mr. Kelsey, to a knowledge of a subject that has evidently escaped his fertile brain. This selector is the invention of C. E. Nicholas, who has been connected with the telephone industry since 1878. He has made the subject of telephone apparatus and selectors his study for years, and there are no features of this industry that he is not perfectly familiar with. The device is only similar to that of some of our

predecessors, in that it works on the "step-by-step" principle. It may be placed in connection with any make of telephone without making any change therein, or running to ground on a metallic system.

If you will imagine a base 1¼ inches thick, seven inches wide and eleven long, having a cover two inches deep, six inches wide and ten inches long, you will have the proportions. Removing the cover discloses the movement mounted on about the middle of the base, as shown in the various illustrations.

No. 1 shows the movement in a normal condition.

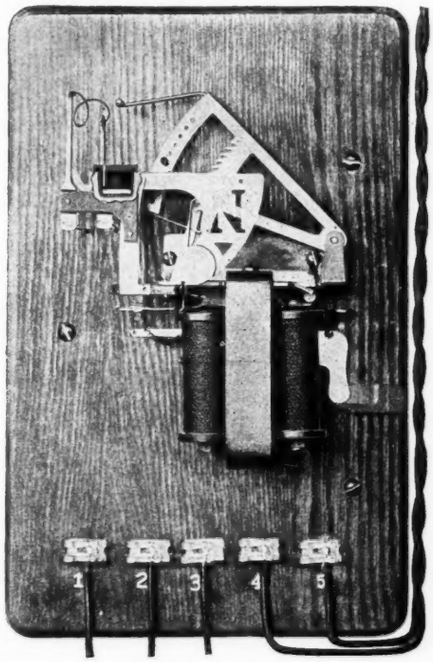


FIG. 3.

No. 2 illustrates how the coils appear in the act of selecting a station.

No. 3, the selector in a locked-out position.

No. 4, how the coils are swung to the right to restore the parts to the position, as shown in Fig. 1.

No. 5, the key to be used at the switchboard.

No. 6, a bridged ground line equipped with selectors. At one station is shown the circuits of the telephone instrument.

Secured to the base of the selector is a switch blade and moveable arm, which lies behind the coils, slightly projecting from the side of the cover. Connecting with the blade and contact is a 1/100 m. f. condenser, too low in capacity to hold a conversation through. This is placed in a recess on the back of the base, and in front of a two m. f. condenser. The functions of these condensers will be explained further on. The cover is finally locked to the base, so that the work cannot be tampered with by inquisitive subscribers.

The movement before being placed on the base is mounted on a frame that has been blanked, perforated, and formed by steel dies in heavy presses from sheet steel. The other parts are cut and formed from sheet brass and fibre, every part being as perfect and accurate as the parts of a clock. Hanging down over the front of this frame, and fastened securely to it, is a drop-forged, permanent steel magnet. Directly underneath, from the middle of the frame, is suspended a pair of 1,000-ohm coils (or of higher resistance if needed), having their pole pieces beveled so as not to strike the magnet, as they swing inside of its lower projection. The coils are united at the top by an iron yoke, on the left-hand end of which is a lifting pawl that engages with a toothed segment held in a trunion bearing on the right hand end of the frame. Near the outer edge of this segment is a row of ten holes, in any one of which a projecting stud is set, to designate the number of the station the selector is set for. In the cut it is No. 6.

Pivoted at the opposite, or left hand end of the frame, is a retaining pawl, engaging with the segment, when it is lifted by the electro-magnets or coils. At this end is secured a fibre insulation, on which is fastened a double standard. Balanced freely and firmly between these standards is a piece with an arm, which we will call a target, as it indicates, through a small circular window on the front of the cover, when the line is busy. On the other end, acting partially in the nature of a counter-balance, is a pressed steel cup, about one-half inch in depth and diameter. In this is placed a drop of pure mercury. A fibre cap is then pressed on, hermetically and permanently sealing it; through this and to one side is driven a steel needle, having a flexible connection attached, but not far enough to come in contact with the mercury; but when the cup is inclined to one side it causes the mercury to flow over and immerse its point. This is shown in Figs. 2 and 3, where a portion of the frame and cup are broken away, showing how the connection is made and broken on the needle by the position of the cup.

To explain the operation of the selector it will be necessary to speak of the central office equipment, which consists of a simple key, with which any pair of cords can be used, which we term a master key (Fig. 5), which is placed on the switchboard to the right of the line of the cord key. We are also bringing out a noiseless calling box, of small dimensions, which can be placed anywhere on the board, that selects and rings in a jiffy, and also restores, any station required. With the key and box, you would always have an auxiliary in case of an accident to either.

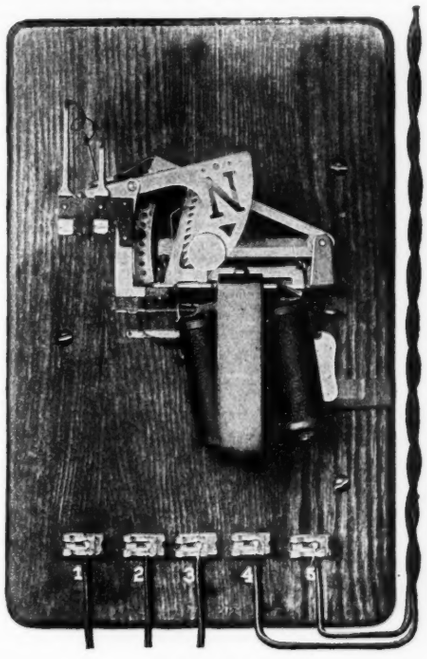


FIG. 4.

After inserting the key in the board, you clip the generator wires, running them in one No. 1, and out on No. 2. (See cuts.) From a battery such as is used in a pole changer, of from forty to sixty cells, according to the conditions required, run wires to No. 3. We now give such directions as will be found in card form on the inside of the cover of each selector.

"Fasten the selector on the wall near the telephone; take the duplex or incoming wire from the telephone and connect it to the binding post, Nos. 4 and 5 in the selector.

From posts Nos. 1 and 2 run wires back to the telephone. Disconnect the wire that connects the ringer to the line post of the telephone, lengthen it out, and connect it to the binding post, No. 3, in selector. Then call "Central" and have her call the station you are at. If the selector does not move in the right direction for selecting, reverse wires Nos. 4 and 5. After the selection is made, if the bell does not ring reverse wires Nos. 1 and 2. On a bridged ground system (Fig. 6) the line wire is brought to post No. 5; then from No. 4 to ground, but on a bridged, metallic line, from No. 4 to the other side of the line.

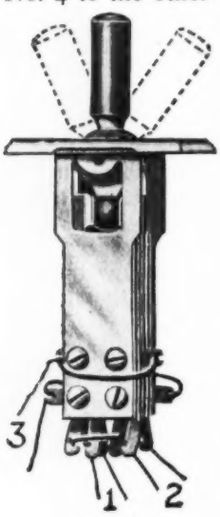


FIG. 5.

To use the selector, operator first pulls the knob of the master key to a locked position and then pulls the cord key as many times as the number of the station required. Each time this is done an impulse of direct current is sent out, which causes the coils to swing to the left and lift the segment a notch, where it is held by the retaining pawl as the coils swing back to their normal position, and until another impulse is given. When the station has been selected, the projecting stud of the segment has engaged with the latch on the target, and lifted it to an inclined position (See Fig. 2). The line circuits are now complete to the telephone, and we will trace them, taking the ringing current first.

From line post No. 5 it leads to the under contact of the switch blade on the wooden base, to the standard, target, stud; segment and frame, to post No. 3, thence to the bells of the telephone, and back to post No. 2; from this to the large condenser to line post No. 4.

It has never been a very difficult matter to make an electrical instrument to select a particular station, and even give a signal, as evinced by the "579 patents." But there must be some dark, inherent difficulty somewhere, else why are not more of the 95 per cent in use after all these years?

Selectors to be made perfectly satisfactory must be free from wiping connections and sliding contacts, no matter how well they be made or otherwise constructed. Large guns were at one time securely fastened in masonry to prevent their recoil. In the present age the "recoil" is used to aid in re-loading, and also for repeating rifles. So we have utilized forces heretofore left dormant.

When we say that "large bodies move slowly" we disclose the fundamental principle on which our selector works. We have shown how the selector coils move under the impulses of the D. C. as they are sent out by the operator. Perhaps someone has thought "What makes the coil swing to the left?" To explain:

The permanent magnet has polarized the coils, so that when, for instance, the positive current is sent through them, the north poles of one of the coils—made so by the current—is attracted to the south pole of the permanent magnet, and the south pole of the coil is repelled. But when the negative current is sent out, it reverses the polarity of the coils, and swings them in the opposite direction. But when the A. C. or ringing current, which is composed of both of these currents, passes through the coils, its impulses are too rapid for the coils to respond to, as does the light armature of the ringer. And while the latter vibrates rapidly, the former have no perceptible movement. Now we will trace the talking circuit, as the subscriber lifts the receiver from the hook, in answer to the ring of their bell.

From line post No. 5 we go again, as formerly, to the standard. Now to the cup, which has been tilted, mercury, needle, and flexible connection, to post No. 1, through the talking circuit (receiver and transmitter) of the telephone to post No. 2, and condenser, to post No. 4.

After years of experience we have never felt satisfied to go upon the market with a sliding contact in the talking circuit of a telephone. And while we have had such in successful use, our best judgment condemns it. A mercury contact is the very best known for weak currents, such as produced by the voice in the transmitters. The ringing current, though, can be pushed through "any old thing." Exhaustive tests have proven the mercury contact to be most ideal. Such contacts as we have had in service over a year are as bright and clean as the day they were set up.

To restore the selector, the operator pushes the master key, and pulls the cord key, when the segment is released and falls to a normal condition. In doing so an insulated arm carried by that member presses on the counterweighted end of the target, and inclines it to the same position as it is in when lifted by the stud. This leaves a talking and generator circuit of each telephone on the line, but not the bells. When a subscriber calls up "Central" his bell does not ring nor any other.

Intercommunication may be had by subscriber calling "Central" and giving the number of the party wanted. Central then tells them to "open the switch," which has been heretofore mentioned. In doing so, it cuts out the selector by means of the small condenser. However, the party can hear, when the other party is called and answers. They then close the switch and have the line to themselves. At the end of the time limit, "Central" restores the line, but that does not cut them off until "Central" starts to select again. The large condenser prevents the selectors from being shunted when the receivers are off the hooks. If anyone leaves theirs off they are the only ones to suffer, and not the whole line.

The Nicholas Selectors put in a year ago are working

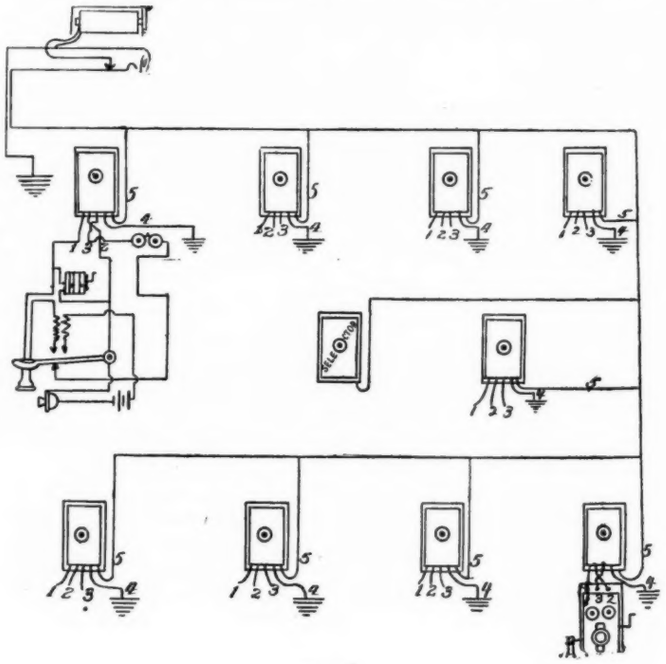


FIG. 6.

perfectly without ever having caused the least trouble, and to the perfect satisfaction of both manager and patron. And why shouldn't they? They are of simple construction, practical and perfect in all their parts and every detail has been studied out to meet every requirement. There is not a spring or adjusting screw about them—nothing to get loose or out of order. What more can be said or desired?

Selective service is surely going to be the coming thing, and will be a great boon to both the manager and subscrib-

er, as better rates can be had, better service given, and trouble and maintenance reduced.

Any magneto exchange can use these selectors to make two to ten-party lines in a town, thus largely increasing its revenue, without materially increasing the cost of the plant, operating expenses, or enlarging the switchboard.

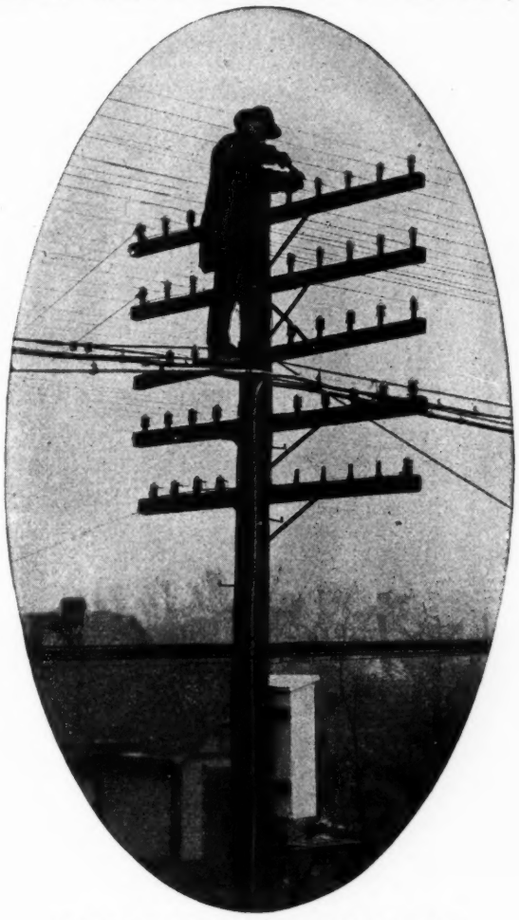
This is not the place to quote prices, discuss terms, or offer inducements, but if you will turn to our advertisement on another page, and write to our address, we will be pleased to do so, or answer any communication you may favor us with.

NICHOLAS TELEPHONE SELECTOR COMPANY.

COMBINATION GASOLINE SOLDERING IRON AND BLOW-TORCH.

The Emmelmann Brothers Manufacturing Company of Indianapolis, Indiana, is successfully introducing on the market a patent combination automatic gasoline soldering-iron and blow-torch, a few of the many uses of which are shown in the accompanying illustrations and will be appreciated by every telephone man.

The merits of this combination tool are many. It is not complicated, and can be understood by any workman. It is durable, is made of the best material suitable for the purposes for which it is used, and will last for years if



LINEMAN MAKING WIRE CONNECTION.

properly handled. There is no platinum coil to burn out, and no pump to get out of order. It can be carried in any tool kit or lineman's belt. The operator can regulate the heat to the requirements of the work to be done.

It can be operated at a very small cost, not to exceed five cents a day to keep it in continual use. The cylinder holds eight ounces of gasoline, will run with one filling for heavy work one hour, and can be refilled without regenerating if done promptly. It saves fully one-half of the time wasted with the old-fashioned soldering-iron, and will pay for itself, by this saving alone, in a very short time. It is well constructed, easily operated, and is cleanly, durable and invaluable.

Soldering copper, as formerly used, made it necessary to use a large copper in order to retain the heat. When this tool was first placed upon the market, it was made with one copper—the small one—but tinners and others

LINEMAN MAKING CABLE SPLICE.

who had been using large coppers, deemed it necessary to continue the use of the large ones, hence we are now sending coppers in two sizes instead of one. The blunt brass valve stem, which is used in this tool, does not enlarge or force out the valve seat as with the old style steel needle valve, for the reason that the valve stem and valve seat are made of the same material, thus making the expansion and contraction uniform; therefore, all binding and grinding is overcome, and the leakage reduced to a minimum. The head is made of the highest grade cast steel; the coppers are drop-forged from bar, making the best and closest grain possible. The cylinder is 16-gauge drawn brass tube, threaded, tinned and sweated at both ends to special alloyed bronze castings. The best material and workmanship is used throughout the construction of this tool.

Weight of tool complete with both coppers, 3½ pounds; length from tip to tip, 21 inches; diameter of body, 1⅜ inches.

Price and further particulars upon application.

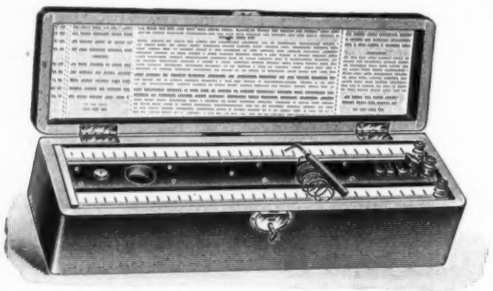
The Stromberg-Carlson Telephone Manufacturing Company, Rochester, New York, reports having closed contracts for switchboards for the following places: Minneapolis, Minn.; Louisville, Ky.; Gilbert Sta., Iowa; Rochester, N. Y.; Miami, Fla.

SANDWICH POLE-CHANGER COMPANY.

The Sandwich Pole-Changer Company of Sandwich, Illinois, was organized July 1, 1905, by E. C. Hennis, secretary and general manager of the Northern Illinois Telephone Company of Sandwich, Illinois. Mr. Hennis, while at the head of the telephone company, not only managed the business successfully, but gave the business a careful and systematic study in its mechanical departments. During the past year he has believed among other things, that a more efficient and simple pole-changer could be produced, and he set about to further this end. A few months ago he called in some of the best electrical telephone experts in the country for consultation, expressed his ideas as to a new ringing device, and after a few more weeks brought out what is now known as the Sandwich Pole-Changer. He has spared no expense as to material and workmanship to make this the most efficient, durable and best alternating and pulsating ringer on the market.

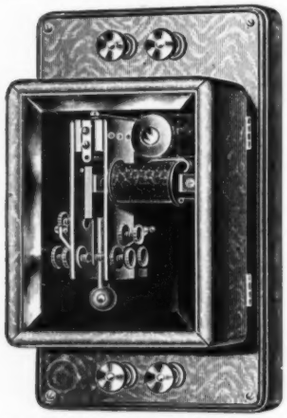
E. C. HENNIS.

After he had had his pole-changer thoroughly tried by some of the largest and best telephone companies in the United States, he decided to start the manufacture of this ringer and looked around for some other specialties in tele-



DIRECT READING TYPE F OHMMETER.

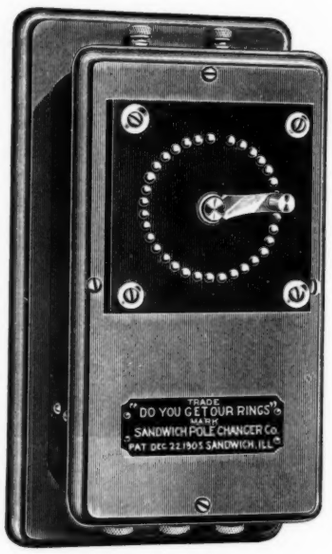
phone apparatus. He finally decided to, and did buy, the patents, machinery, tools and tangible property of the Illinois Electric Specialty Company of Chicago, and moved it to Sandwich, Illinois, where he started the Sandwich Pole-Changer Company, and has associated with him in this company S. P. Sedgwick, president of Sedgwick's Bank of Sandwich, and who is also an extensive manufacturer of farming implements; C. F. Sedgwick, vice-president of Sedgwick's Bank and also director and treasurer of the Northern Illinois Telephone Company, and George L. Cragg, the well-known attorney of Chicago.



INTERIOR VIEW POLE-CHANGER

The Sandwich Pole-Changer Company is now placing on the market through jobbing houses and to the trade direct, pole-changers that ring subscribers at a very low cost, ohmmeters in several styles that measure resistance and locate troubles, duplexers that double line capacity, lease records that simplify office work and fire alarm apparatus. It already is rushed with orders.

It is claimed for the Sandwich Pole-Changer that it is extremely simple, rigid and compact in construction. Its mechanism is mounted on an oak base and covered by a neat oak-hinged box, with beveled plate-glass front and complete instrument; it measures only 9x6x5 inches and weighs but four pounds, and is so constructed that it will work either in a horizontal or vertical position, thus admitting of it being mounted on a cabinet or hung on the wall; as it is practically noiseless it is not objectionable in the operating room.



I. E. S. DUPLEXER.

The machine has but three contact springs, which are made of helmet bronze, and have contact points of very heavy platinum. The contact springs engage alternately from their opposite sides and consequently cannot be forced out of their normal position by extended use. As the whole mechanism is securely mounted and locked in one solid, heavy brass frame, it is quite impossible for any parts to get out of adjustment, and therefore, the pole-changer never requires adjusting after leaving the factory.

No primary cell is used, as the vibrator is fed directly from the main batteries through resistance coils and the consumption of current is hardly one milliampere, which is practically unnoticeable. This eliminates renewal expense of the separate battery and also does away with trouble from frozen elements, where it is necessary for the ringer to be kept in a cold room in frigid weather.

CABINET I. E. S. POLE-CHANGER.

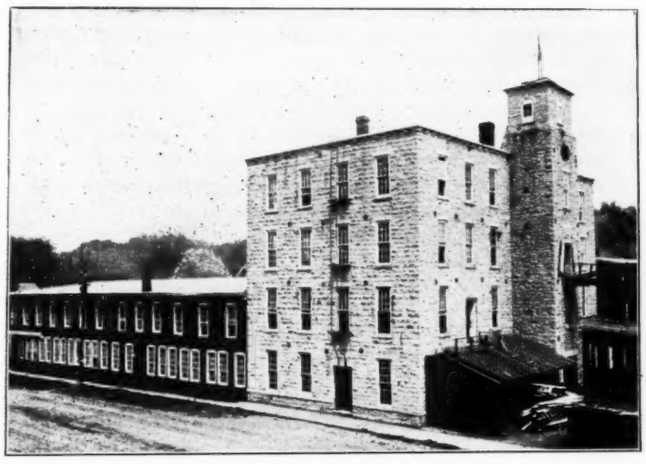
The Sandwich Pole-Changer is made in four different styles. The manufacturers guarantee this generator to do good work and will ship the same on thirty days' trial, to be returned at the company's expense if not satisfactory in all respects.

The Direct Reading Type F Ohmmeter or Trouble Finder is another specialty manufactured by this company. The use of the ordinary bridge set requires considerable

expert experience; the instrument is liable to be inaccurate, on account of the use of a large number of plug contacts and requires at least five to ten minutes to secure even an approximate reading. By the use of the I. E. S. Ohmmeter one can get the resistance directly in ohms, it taking but a moment to obtain this. For locating crosses or grounds on toll lines or subscriber's circuits it is claimed that there is nothing that will approach the I. E. S. Ohmmeter, and that as a cable-testing instrument it stands unexcelled. In a moment's time one can tell whether telephones being purchased are wound to order or not; circuit troubles in switchboards and telephones can be quickly located, and a fault once found can be easily repaired.

It is further claimed for this instrument that it is one of the finest of its kind ever placed on the market. In this instrument a galvanometer is used in place of a receiver, the galvanometer being of the dead beat "D" Arsonval type, having the coil mounted on highly polished needle points in polished sapphire bearings. It is not disturbed by outside influences, either electrical or mechanical, and is very sensitive. The plug contacts are four in number, and but one is used for each reading. The scale is hand drawn to insure accuracy.

This instrument is not only provided with the ohm scale drawn in black, but also with a scale drawn in red for the purpose of cable testing, and without doubt it is one



HOME OF SANDWICH POLE-CHANGER COMPANY.

of the simplest and best cable testing instruments on the market.

The I. E. S. Duplexer is a device for practically making two complete telephone circuits from one pair of wires, or for making three metallic circuits from two pairs of wires. This, as all telephone men can readily see, will not only reduce cost of construction, but equally reduce the cost of maintenance and allow for double toll work. This instrument is furnished with a balancing device so that by simply moving the lever on its face, both sides of the line can be equally balanced, and thus do away with all cross-talk. Should at any time in the future the lines become unbalanced through the rusting of joints or otherwise, by simply moving the lever backward or forward until a point of perfect silence is reached, they can again be balanced and brought up to par.

The Sandwich Pole-Changer Company has many new and useful devices, in addition to those here enumerated, which it will soon place on the market.

The company has retained the services of John C. Shaw of Chicago as superintendent of the factory, which is an assurance of the workmanship being of the highest class.

Beginning September 1, the company will be able to fill all orders the day they are received. It prides itself in being honorable in its dealings, as it takes all the chances by shipping its goods on 30 days' trial, and if not as represented, may be returned at the company's expense.

AMERICAN ELECTRIC FUSE COMPANY'S NEW PLANT AT MUSKEGON, MICHIGAN.

Frank G. Jones, president of the American Electric Fuse Company, handsomely entertained a party of his friends and customers on August 19, 20 and 21, by taking them on a steamboat excursion to view his company's elegant new plant at Muskegon, Michigan, and spend the day in picnic pleasures along the lake at that beautiful resort. It was a most congenial company which Mr. Jones assembled for this occasion, and his past efforts in the role of entertainer should be ample assurance of the fact that all who were his guests upon this occasion were delighted with the trip.

Leaving Chicago on the steamer City of the Straits at 8 o'clock Saturday evening, the party arrived at Muskegon early the morning following, and after a hearty breakfast at Hotel Occidental, took a street car, especially chartered for the occasion, and were conveyed to the site of the American Electric Fuse Company's new factory in the suburbs of Muskegon. The new plant is most advantageously located, and possesses every facility for turning out a perfect product upon the most economical basis.

At the factory, General Superintendent F. W. McMeal took charge of the excursionists and showed them through every department of the immense plant, in many of which operations were in progress, owing to the fact that the company had found it necessary to do some extra work in order to catch up with the large number of orders already on hand. These processes, particularly the brazing of the copper connectors and the assembling and finishing of the protective apparatus, proved to be most interesting to all.

The new factory is an ideal one in every respect, possessing all of the requisites of abundant room with maximum light and ventilation. The construction is of the most substantial character, as is evidenced by the enormous beams, pillars and trusses with which the big, three-story structure is sustained. The main plant consists of two large brick buildings, each of which is 210 feet long, 50 feet wide and three stories high. In addition to these, there are separate engine rooms, dry kilns, brazing rooms, etc., as well as a storage warehouse for chemicals, etc., which is apart from the other buildings.

Throughout the entire factory, system was pleasantly apparent to all. The company carries a great amount of stock, and all of this is carefuly arranged and so labeled that it is available at a moment's notice and convenient to the workmen in each department.

It may be furthermore stated in this connection that Mr. Jones has fully demonstrated his managerial ability by surrounding himself with competent men in every department of his work.

After viewing the new factory to their entire satisfaction, the party returned upon their special car to the boat landing, where a steam launch, chartered for the occasion, conveyed them and a number of rowboats across Lake Muskegon to the side opposite from the city, where, upon a high bluff commanding a full view of the magnificent panorama, and in the shade of a fine forest of natural trees, the party spent the day in games and amusements of various kinds, being regaled at noonday and at 6 p. m. with two of the finest meals known to the culinary art. On the bills of fare were such tempting dishes as spring chicken, mashed potatoes, corn on the cob, salads, eggs, melons, coffee and various other appetizing dishes and beverages. Those who desired spent a portion of the day in fishing, but the finny tribe had apparently received advance information of the fell designs entertained against them, and had hied themselves to other and more sequestered spots.

Upon returning to the landing at 8 o'clock, the party boarded the "City of the Straits" and enjoyed another delightful moonlight ride back to Chicago.

Not a feature was wanting in the entire trip which could add to the pleasure and success of the occasion. Even the elements co-operated with Mr. Jones, for the weather was ideal and the lake was as calm and unruffled as the temper of our old friend Job.

It would be appropriate to present, in connection with this account of Mr. Jones' delightful excursion, a good view of his fine, new factory, but no photographs of same are available at this time. Suffice it to say that nothing has been left undone, essential to the perfect and economical production of copper connectors, fuses and protective apparatus. This was the unanimous verdict of all who partook of Mr. Jones' hospitality upon this trip and who had the pleasant opportunity of seeing for themselves, while at the same time enjoying a most delightful outing.

METAL FURNITURE.

The Electric Appliance Company of Chicago and San Francisco is bringing before the telephone public a line of metal furniture for use in the operating room. This company has kept in mind the fact that comfort, strength, durability, attractiveness and low prices will make the line a big success.

TWO TYPES OF OPERATOR'S CHAIRS.

Metal furniture is such a decided improvement over the old wooden furniture that a comparison is hardly necessary other than to say that it is more sanitary and more durable. All of the frame work on these chairs is made from Bessemer steel rods, twisted and interwoven so as to give very rigid construction. Every possible adjustment has been considered so as to make it a comfortable chair for the operator. The back can be raised or lowered and moved in or out. The seat also can be raised or lowered. Changes in temperature and atmosphere will in nowise affect this chair, and, further than that, it will not deteriorate rapidly in looks.

Prices and further particulars will be furnished upon application.

OFFICIAL INDEPENDENT TELEPHONE SIGNS.

At the last National Independent Telephone Convention, held in Chicago during the month of June last, an official emblem or symbol of the Independent movement was adopted, and will henceforth be universally employed by all Independent telephone companies, wherever signs and devices of this kind are desired. Emblems of this character are particularly desirable in front of telephone offices, in telephone booths, and in windows wherever pay-stations are located. Many thousands of these signs will be ordered in the Independent field during the coming year, and the Burdick Enamel Sign Company, of 52 State street, Chicago, which is already widely and favorably known throughout the Independent field, has taken time by the forelock and laid in a very complete stock of the finest enameled steel signs which it is possible to procure. It was largely due to the influence and persistent efforts of Mr. Burdick, personally, together with his able lieutenants and artists, that the red, white and blue shield, suitably lettered, was finally adopted as being the most attractive, most conspicuous and most appropriate emblem which could possibly be had. Mr. Burdick and his staff devoted their entire time during the National-Interstate Telephone Convention to the task of exhibiting and demonstrating this fact thoroughly to the committee on official emblems, and all others interested, including nearly all of the foremost men in the Independent movement. Without doubt, the most satisfactory emblem which could be designed was that furnished by Mr. Burdick, and eventually adopted by the committee and ratified by the convention as a whole.

The Burdick Enamel Sign Company is one of the largest and best known concerns of its kind operating in the telephone field, and is also known the world over wherever signs are used. It will be glad to furnish circulars, descriptive of its stock of signs, showing the different sizes, styles and prices, and all inquiries pertaining to the telephone feature of their business will receive particularly prompt and courteous attention. Now that the national official emblem has finally been adopted, it is to be hoped that every Independent telephone company in the world will order as many of these handsome signs as may seem appropriate to their business, and will place them in conspicuous positions so that the general public may realize, more than ever before, the extent and importance of the Independent movement. Not only will the general effect upon the public be noticeable, but the increased patronage derived through the aid of signs of this kind will be very marked in the course of a year.

EXHIBITS AT ILLINOIS CONVENTION.

The following companies made exhibits at the recent convention of Illinois Independents at Peoria, the names of the representatives also being given:

North Electric Company, Cleveland, Ohio—Raymond Hendrickson, I. J. Kusel.

Kellogg Switchboard & Supply Company, Chicago—C. E. Roberts, C. H. Wheeler.

Dean Electric Company, Elyria, Ohio—Fred E. Freers.

Stromberg-Carlson Telephone Manufacturing Company Rochester, New York—Paul D. Meyers.

International Telephone Manufacturing Company, Chicago—H. H. Davenport.

Automatic Electric Company, Chicago—A. J. Rousseau.

F. B. Cook, Chicago—F. W. Pardee.

Electric Appliance Company, Chicago—H. N. Remington, M. R. Nyman.

Rock Island Battery Company, Rock Island, Illinois—M. A. Loeb, W. B. Roberts.

A. H. Andrews Company, Chicago—M. P. Kellogg.

Modern Electric Company, Burlington, Iowa.

Baird Manufacturing Company, Chicago.

The following were in attendance, representing manufacturers: H. C. Griffin, John A. Roebling Sons Company, New York; J. E. O'Neil, Standard Underground Cable Company, New York; D. Newman, Illinois Electric Company, Chicago; C. L. Matthews, Stombaugh anchors, St. Louis.

Trade Notes

A Bureau of Exchange for the purpose of assisting employes to secure positions worthy of their experience and ability, also for securing competent employes for exchanges needing them, has been organized by the Chicago Telephone Supply Company of Elkhart, Indiana.

The Metropolitan Electrical Supply Company, 184 Lake street, Chicago, has enjoyed a very prosperous season, and is now enlarging its space to accommodate increasing trade. This well-known firm carries a full line of telephone supplies, including wire, batteries, measuring instruments, solder, receivers, etc.

Frank B. Cook, Chicago, has recently been granted a number of additional patents on self-soldering protective apparatus. Four such patents have been secured within a month, making a total of twelve self-soldering protector patents which have been secured by him during the last year.

The International Telephone Manufacturing Company, Chicago, reports a constantly increasing demand for its transmitter, especially for toll line switchboard use and for long-distance service. These transmitters, provided with especially prepared granular carbon, have a very strong, clear and natural tone and do not "fry" or "pack."

The Pearne, Krum Company, 39 North State street, Chicago, is installing its flashlight transfer system on a new switchboard which the Fisk-Newhall Telephone Company is building for the Sullivan (Ill.) Telephone Exchange. The Pearne-Krum device is said to give the speed of multiple boards at one-tenth the cost. Some very strong endorsements have been given it by prominent telephone companies.

The Swedish-American Telephone Company, Chicago, whose advertisement appears on another page of this issue, has just issued a handsome 32-page catalogue, containing fine half-tone illustrations of its product, as well as describing the different parts. The cover design is especially striking, being a reproduction of the company's well known trade mark in three colors on a light gray background. The catalogue will be sent free on request.

The Tornquist Electrical Manufacturing Company, Davenport, Iowa, has just issued a new reduced price list on its line of knife switches and telephone protectors, and will be pleased to mail the same to anyone interested, upon request. It also has reduced the size of its telephone protector and is now mounting it on red lacquered slate, which seems to take very favorably with the telephone trade. The company also makes arresters for all kinds of telephone service. In writing, specify the system you use.

The Sumter Telephone Manufacturing Company of Sumter, North Carolina, has found it necessary on account of the great increase in business to make large extensions in the manufacturing plant to catch up with orders, on which it is somewhat behind. It became necessary for this company to call in all of its traveling salesmen so that it could catch up with orders. It is said that this company had to refuse a $100,000 contract with the United States government for telephones because it was so rushed that it was not convenient for the company to comply with the terms of the contract immediately.

Chester Carew and W. B. King have succeeded J. H. B. Howell in charge of the western office of the Joseph Stokes Rubber Company, Boston, at 40 Dearborn street, Chicago. The Joseph Stokes Company will engage more extensively than heretofore in the manufacture of receiver shells, transmitter mouthpieces and other hard rubber specialties for the telephone trade.

The Lyon Metallic Company, 18 South Ann street, Chicago, has recently made two additions to its plant in order to accommodate its increasing trade. Quite an important percentage of the same is derived from the telephone field. Telephone manufacturers are heavy purchasers from this firm, of whom they buy metal receptacles of various kinds. The firm also makes a very desirable locker for use in factories and large exchanges.

Letters Patent No. 794,742, under date of July 18, 1905, has been issued to Henry E. Procunier, president of the Moon Manufacturing Company of Chicago, for improvements in "Soldering Nipples for Electric Cables." This patent covers broadly on self-soldering nozzles. Other patents pending cover the use of self-soldering nozzles with terminals and junction boxes, also certain other features of Moon apparatus. It is the purpose of this company to protect all rights it may have, granted by these patents.

E. K. Goudy is at present in Nome, Alaska, looking after the installation of the common battery switchboard and telephones made by the Chicago Telephone Supply Company of Elkhart, Indiana, for the purpose of entirely re-equipping the system of the Alaska Telephone and Telegraph Company. The United Telephone Company of Iowa has recently placed orders for three 300-line switchboards for use in their exchanges at Reinbeck, Traer and Gladbrook. These orders were all placed with the Chicago Telephone Supply Company.

From all reports, telephone trade for the autumn of 1905 will be one of the very best in the history of the industry. Crops are said to be almost universally fine, and reports which the different manufacturers and supply houses are receiving daily from their salesmen in all sections of the country tend to show that a period of unusual prosperity is at hand. Up to date, the season of 1905 has generally been a very satisfactory one, and with such flattering indications ahead, those engaged in the telephone industry certainly have good reasons to rejoice.

The Swedish-American Telephone Company, Chicago, has recently furnished complete equipment for the following named telephone companies: Aurora County Telephone Company, White Lake, S. D.; Cyrus (Minn.) Mutual Telephone Company; Hand County Telephone Company, Miller, S. D.; Comfrey (Minn.) Rural Telephone Company; Magnet (Neb.) Independent Telephone Company; Inland Co-operative Telephone Company, Colfax, Wash.; Clear Lake (S. D.) Telephone Company; Petersburg Telephone Company, Petersburg and Athens, Ill.; Lagro (Ind.) Independent Telephone Company; Belden (Neb.) Telephone Company; Boyd (Minn.) Telephone Company; Bison (Kan.) Independent Telephone Company; Northwestern Telephone Company, Creston, Ind.; Arco (Minn.) Telephone Company; Geuda Springs (Kan.) Telephone Company; Watson Telephone Company, Otsego, Mich.; People's Mutual Telephone Company, Lacygne, Kansas. The Swedish-American company reports business good, there being a large demand for the company's new improved type magneto instruments.

IN THE RURAL LINE DISTRICTS

People along the rural telephone lines continue to "rubber."—*Fargo (N. D.) Forum.*

The telephones are most all in now so we can talk to our neighbors.—*Salina (Kan.) Union.*

The telephone boys were out from Wood River Tuesday looking after the telephones.—*Cameron Cogitations in Grand Island (Neb.) Independent.*

John Hansman is doing a big telephone business. Nearly everybody has a telephone in this neck of the woods.—*Centerville Citations in Carmi (Ill.) Democrat.*

Many new telephones have been put in in this neighborhood. We can now get connection with almost all of our neighbors.—*Platte Letter in Ashland (Neb.) Gazette.*

The telephone gang is again with us and is adding more wires to the exchange. They are stopping with Mrs. Allie Holbrook.—*Coleta Contributions in Sterling (Ill.) Gazette.*

The telephone line from Galesburg to Leeman is completed and you can hear the ring of the telephone at Galesburg every little while.—*Navarino Nudges in Shawano (Wis.) Advocate.*

J. O. B., the telephone boss, is still hustling the telephone business, and is putting in an average of over one-half dozen telephones per week.—*Sinai Slivers in Brookings (S. D.) Individual.*

The Mountaineer says that the telephone lines out of Kooskia are worse than clothes lines to talk over. The hired girl was consulted before the statement was made.—*Boise (Idaho) News.*

Telephone talk is heard. Two companies are removing their lines near here and some families are having telephones put in their homes.—*Corvuso Clippings in Hutchinson (Minn.) Leader.*

There are a dozen or fifteen men and about as many teams been working on the Groton & Ferney telephone line all week. It will not be long before you can say hello for ten cents.—*Groton (S. D.) Herald.*

All the telephone lines are up and in good running order again. The farmers who have been without phones during the high waters, say that they wouldn't be without telephones for fifty dollars.—*Concordia (Kan.) Kansan.*

C. A. Starr, John Norton and James Robertshaw are now connected on the rural telephone line and ready to talk with their neighbors. They are just in time to secure help for harvest and threshing.—*Gettiner Glimpses in Hastings (Neb.) Tribune.*

Charles H. North, of the North Electric Company, was down here duck shooting one day last week. He had breakfast in the

U. S. Hotel, and Miss Nora Snuffles, a waitress lady, asked him how he would have his eggs. He told her, "Blind in one eye."—*Bridgeport (Ind.) Beacon.*

We learn with pleasure that Mr. Edwin R. Harding of the States will shortly visit this section in the interests of the Poco growers. It will be remembered that Mr. Harding was the man who introduced the Poco tree in these parts, and for some years devoted his entire time to its cultivation, but since he left the country the industry has dwindled to almost nothing. It is expected that Mr. Harding's knowledge of Poco culture will enable the growers to make the industry as profitable as formerly. The portrait presented herewith is one Mr. Harding had taken here on his plantation, shortly after leaving Cambridge college, where he made a special study of trees and bugs. His success as a Poco grower shows his knowledge of trees, and we understand he is now engaged in the electrical business, where a knowledge of bugs is of most importance. We were told he was conducting a lightning bug or fire fly farm, but believe this must be an error. Mr. Harding, it is said, will introduce the electric light plant among the Poco growers. Whether this is a plant or tree we do not know. It may be a sort of plum tree. The editor will interview Mr. Harding upon his arrival on our shores, and will publish the interview for the benefit of our readers.—*New Zealand Bushwhacker.*

The work of digging holes for the rural telephone line in this section is quite well advanced. John Johnson and one of the Lanser boys have hired out to the company to dig holes and are getting along nicely.—*Grant Center and Madison Notes in Milbank (S. D.) Review.*

Will Roller, the hustler of Kingsport, has a telephone line to Bristol on the Reedy Creek road, and will put in a switchboard tomorrow at the "Corner," alias "Peltier," alias "Lovedale," alias "Love Port." Say, let us all call it Love Port.—*Blountsville Bits in Bristol (Va.) Herald.*

The young man who attempts to talk over the telephone wire to five girls at the same time certainly has a problem on his hands to tell which from which. Along this line let us extend a little advice, viz., never propose by telephone.—*New Zion Notations in Lancaster (Mo.) Republican.*

The telephone proves a success here, but is hard to arrange so as it will be equally divided. Women folks all the time, men folks at meal times, children during church hours and music at ten, then Oscar tells them to "forget it" until 7 a. m.—*Hollywood Hellos in Watertown (Minn.) News.*

Miss Blanche Ashley, who has been employed as operator at the White telephone exchange since last September, has tendered her resignation to take effect this week. Miss Ashley says that she intends to sleep for six weeks before considering any other position.—*Homer Happenings in Champaign (Ill.) News.*

Tom Hughes, principal trouble shooter for the company, returned Wednesday night from Sisson and other up-the-canyon resorts, where he had been tampering with the telephones that needed fixing. He says all the summer resorts up the canyon are full and he found a few people in the same condition.—*Redding (Cal.) Free Press.*

A new use for telephones has developed over in Oakland county. A lightning bolt struck a house the other day, coming down the chimney and from there jumping across the room to the hello machine and going out without making any particular fuss. Few people want to risk being "spoke to" that way, however.—*Northville (Mich.) Record.*

Don't get on your ear if you don't get attention at the telephone exchange during a thunder and lightning storm. The electric fluid has a special liking for the "hello girl" and frequently chases them out of the office and around several blocks. The woman who squats on a feather bed in the middle of a room during an electric storm should not expect a mite of a telephone girl to sit on a stool and play with streaks of lightning.—*Kimball (S. D.) Graphic.*

Incorporations of the Month

ARKANSAS.

MAGNOLIA—Magnolia Telephone Company. Capital stock, $15,000. Incorporators, R. L. Moon, president; Gus Kohn, secretary.

CANADA.

OAKLAND—Four branches of the Home Telephone Company were incorporated August 17, the branches being those for Oakland, San Jose, Fresno and Stockton. The capital stock of the Oakland branch is placed at $3,000,000, with $30,000 subscribed. The San Jose branch has a capital stock of $2,000,000, which $30,000 subscribed; the Stockton branch has a capital stock of $1,500,000, with $20,000 subscribed; and the Fresno branch a capital stock of $2,000,000, with $30,000 subscribed. The directors of the Oakland branch are: L. Webster, J. E. Schoenfeld, J. Robinson, William Thomas, William L. Gerstle, Thomas S. Parkhurst, Jr., and L. S. Ackerman. With the exception of Gerstle and Webster, the same persons constitute the directorate of the other branches.

CALIFORNIA.

MELITA, MAN.—The Melita-Arthur Telephone Company has been incorporated under the Manitoba Company's Act, with a capital of $10,000. The provisional directors are D. Day, Arthur; L. W. Hunt, Lyleton; W. J. S. Atkinson, Melita.

CONNECTICUT.

DANBURY—Rogers Telephone and Electric Company. Capital stock, $20,000. Incorporators, Arthur Baldwin, New Jersey; N. B. Rogers, George L. Eastman, C. B. Rogers, Annie R. Davenport, Danbury; Frank E. Wiske, New York.

IDAHO.

BOISE—Pacific & Idaho Northern Telegraph and Telephone Company. Capital stock, $100,000. Incorporators, L. C. Van Riper and Joseph M. Dever, New York; Edgar M. Heigho, Lewis Hall, and Frank Gribbon, Weiser, Idaho.

ILLINOIS.

ALTAMONT—Effingham County Telephone Company. Capital stock, $6,000. Incorporators, C. E. Munday, A. B. Munday, G. F. Taylor.

GENESEO—The Geneseo Telephone Company. Capital stock, $2,500. Incorporators, C. T. Tomlinson, G. B. Dedrick, D. M. Stamm.

POLO—Polo Mutual Telephone Company. Capital stock, $5,000. Number of shares, 2,000; price of each share, $2.50. The principal office will be in the city of Polo. Actual stock paid in, $2,987.50; balance to be held subject to the call of the directors. At a meeting of stockholders directors were elected for one, two, and three years, as follows: J. Eckerd, J. H. Donaldson, C. W. Hays, one year; George Dick, Jerry Stuff, John R. Netts, two years; A. M. Johnson, W. U. Powell, James Anderson, three years. Work will begin immediately on the new line.

INDIANA.

LOWELL—Lowell Telephone Company. Capital stock, $9,000. Directors, John H. Spindler, Samuel C. Pletcher, and Clifford O. Hill.

WEST TERRE HAUTE—West Terre Haute Telephone Company. Capital stock, $10,000. Directors, Burton Cassaday, D. S. Gosnell and H. H. Knipe.

FORT RITNER—The Tri-County-Fort Ritner Telephone Company. Capital stock, $840. Directors, Harvey S. Dixon, William P. Holland, Joseph P. Allen, Thomas Faris, Robert N. Flinn, Henry Woolery, H. W. H. Reed.

LEOPOLD—A new telephone company, known as the Leopold and Reno Telephone Company, has been organized here. It will develop the county in and about Leopold. A. J. Meumier, Dr. Taylor, James Ward, and J. J. Jennett are the directors.

IOWA.

EMERSON—Mills County Telephone Company. Capital stock, $50,000.

EARLHAM—Adams Township Mutual Telephone Company. Capital stock, $2,000.

WOODWARD—Woodward Mutual Telephone Company. Capital stock, $15,000. S. B. Shumway, president.

KELLERTON—The Kellerton Mutual Central Telephone Company. Capital stock, $10,000. Incorporators, C. W. Beck and others

MALLARD—Mallard Mutual Telephone Company. Capital stock, $12,000. Incorporators, J. P. Mulroney and others.

WEST BRANCH—West Branch Telephone Company. Capital stock $12,000. Incorporators: J. T. Butler, and others.

RIDGEWAY—Madison Township Telephone Company. Capital stock, $2,000. Incorporators, Ole Gilbertson and others.

EARLHAM—The Adams Township Mutual Telephone Company. Capital stock, $2,000. Incorporators, L. L. Norse and others.

MYSTIC—The Mutual Telephone Exchange. Capital stock, $5,000. President, J. W. Calvert; vice-president, J. H. Luse; secretary, D. B. Forsythe.

OTTER CREEK—Otter Creek and Liberty Center Mutual Telephone Company. Capital stock, $3,000. J. H. Sandy heads the list of stockholders.

EXIRA—The Wakefield & Cass County Telephone Company. Capital stock $2,000. President, A. F. Anderson; secretary, J. C. B. Anderson.

LAKE PARK—The Farmers' Exchange has been incorporated at this place with a capital of $1,000. The incorporators are A. E. Bush and others.

UTE—The Soldier Valley Mutual Telephone and Telegraph Company. Capital stock, $5,000, in shares of $25, and the incorporation to run for twenty years, with the right of renewal and succession. The officers are as follows: President, S. D. Crary; treasurer, H. A. Tinker; secretary, W. C. Buskirk; directors, Dr. B. C. Stewart, E. B. Ullrich, C. J. Bartels, Adam Feuerbach, Henry Witte, and Joseph Carritt.

KANSAS.

GEUDA SPRINGS—The Geuda Telephone Company. Capital stock $8,000.

STOCKTON—The Ash Creek Telephone Company has been incorporated in this city with a capital stock of $2,000.

MULBERRY—The Mulberry Telephone Company has been incorporated at this place, with a capital stock of $2,000.

ADA—The Rural Telephone Association of Ada has been organized to build an exchange in Ada and rural lines in surrounding territory. J. N. Bozek is secretary.

KENTUCKY.

DANVILLE—The Danville Home Telephone Company, with $5,000 capital, has been incorporated by Samuel Menifee, editor; G. W. Welsh, cashier Farmers' National Bank, Danville; Capt. William Herndon, attorney; W. R. Bastin, electrician; and H. V. Vastin, electrical engineer, Lancaster, for the purpose of putting up a copper line from Danville to Harrodsburg, ten miles, where connection will be made with the Louisville Long-Distance lines. Thirty toll telephones will be placed in Danville. The Bastin lines, reaching from southeastern Kentucky, will be placed in the Danville Home board.

MICHIGAN.

THREE RIVERS—The Southern Michigan Telephone Company. Capital stock $300,000.

MINNESOTA.

DEERWOOD—The Deerwood and Bay Lake Telephone Company. Capital stock, $3,000.

SACRED HEART—Farmers' Consolidated Telephone Company. Capital stock, $50,000.

BROOTEN—Brooten Telephone Company. Capital stock, $4,500. Incorporators, T. O. Shelso and others.

EITZEN—The Eitzen and New Albin Telephone Company. Capital stock, $3,500. Incorporators, Henry Vonderohe and others.

RENVILLE—The Farmers' Consolidated Telephone Company of Renville County has been incorporated with a capital stock of $50,000.

HARTINGTON—The Cedar County Farmers' Telephone Company. Capital stock $5,000. Incorporators: A. H. Cressey, L. D. Greenwood and others.

VILLARD—Villard Telephone Company. Capital stock, $10,000. Incorporators, C. F. Angell, E. L. Scoville, B. A. Angell, L. F. McGray, W. R. Burter, A. E. Clark, J. W. Burter.

MINNEAPOLIS—The Telephone News Company of Minnesota has been incorporated with a capital stock of $10,000, by Albert M. Jennings of Chicago; E. E. Hunt, Minneapolis; Alfred L. May, St. Paul.

BROWERVILLE—Browerville, Philbrook and Motley Telephone Company, Browerville. Capital stock, $10,000. Incorporators, Chester Hawley, C. A. Jones, Harry Lee, John H. Sheets, T. Tyrrell, Browerville; C. K. Randal and William Roberts, Philbrook.

MISSOURI.

CARL JUNCTION—Carl Junction Telephone Company. Capital stock, $10,000. Incorporators, G. A. Welbourne, H. C. Welbourne and H. C. Robertson.

OAK GROVE—The Texas Prairie & Oak Grove Telephone Company has been organized by sixteen farmers living southeast of this place. They will build a line into Oak Grove.

ST. LOUIS—American Phantom Circuit Telephone Company. Capital stock, $10,000. Incorporators, R. C. Stubbs, E. H. Cary, J. R. Lowry. Purpose, to secure, use, and deal in patents and inventions to be used in connection with telephone and telegraph systems, etc.

MISSISSIPPI.

BRAXTON—The governor has approved the charter of the Braxton Telephone Company of Braxton, Simpson County. Capital stock, $15,000. Incorporators, J. H. Gibson, L. D. Spell and others.

HATTIESBURG—The city council has granted a franchise to J. A. and S. A. Jones and George D. Winter of Chicago to build an underground telephone system, at a cost of $125,000. The franchise is to run for twenty-five years, and work is to begin in thirty days. A bond of $5,000 was deposited to guarantee the completion of the work.

NEBRASKA.

WINNETON—The Farmers' Union Telephone Company has been incorporated at this place.

CALLAWAY—The Callaway and Arnold Telephone Company has been incorporated at this place.

POWEL—The Powel Stock Telephone Company, capital stock $10,000, has filed articles of incorporation with the secretary of state.

HARTINGTON—The Cedar County Farmers' Telephone Company. Capital stock, $5,000. Incorporators, A. H. Cressy and L. D. Greenwood.

HICKMAN—Articles of incorporation have been filed for the Hickman Telephone Company. Capital stock, $6,000. Incorporators, Adam Brendle, J. F. Judah, C. L. Morrison, Henry Diesel, A. E. Van Burg, B. H. Sinker, R. H. Sawyer, Charles Hemple, August Schmutte.

NEW HAMPSHIRE.

WARREN—The Baker's River Telephone Company. Capital stock, $1,000.

NEW JERSEY.

CAMDEN—The Norton Electric Manufacturing Company. Capital stock, $100,000. Incorporators, Abner Smith, Frederick G. Norton, David L. Hart.

JERSEY CITY—United Pay Station Telephone Company. Capital stock, $5,000. Incorporators, H. O. Coughlan, Thomas F. Barrett and J. W. Woods.

JERSEY CITY—The Merchants' and Miners' Telephone and Telegraph Company. Capital stock, $500,000, in shares of $100, all common. Incorporators, S. R. Peary, James L. Stewart, Joseph Gales, Jr.

STEWARTSVILLE—Stewartsville Telephone Company. Capital stock, $10,000. Incorporators, Benjamin F. Strader, Stewart A. Shillinger, Michael E. Dowling, John C. Boyer, William Y. Bush and others, all of Stewartsville.

CAMDEN—Wyoming Gas and Electric Company; registered office, Camden; agent in charge, New Jersey Corporation, Guarantee and Trust Company. Capital stock, $15,000. Incorporators, John A. MacPeak, William F. Eidell, F. R. Hansell. The company is to manufacture and supply gas, water, electricity, and heat; also to operate telephone and telegraph lines.

NEW YORK.

WEEDSPORT—Weedsport Telephone Company. Capital stock, $20,000. Incorporators, C. S. Caywood, N. F. Durston, and George R. Nash, all of Weedsport.

EASTON—The Easton Telephone Company. Capital stock, $2,000. Directors, George Gifford, Allen Rathbun, Charles Gifford, Lawrence Dorsey of South Easton, and F. W. Borden and R. A. Borden of Easton.

CLARENCE—Pioneer Telephone Company. Capital stock, $10,000. Incorporators, G. D. Carmer, O. A. Martin, E. Weinange, William H. Bald, Jr., F. W. Schaad, Clarence; H. G. Britting, Williamsville; F. C. Gould, Lockport.

EAST CONCORD—East Concord Telephone Company. Capital stock, $5,000. Incorporators, Homer Vaughn, H. J. Curtis, C. J. Hollister, and Viola Titus, East Concord; F. S. Lord, Elmer Van Atta, and A. L. Twitchell, Springfield, N. Y.

VOLNEY—The Volney Telephone Company has been incorporated to operate a telephone system between Fulton and Volney. The directors are E. B. Tice, James Vant, J. S. Moss, Robert Simpson, Jr., Eugene Rowe, E. T. Hart, and C. E. Sackett, all of Volney.

NORTH DAKOTA.

CASSELTON—The Western Telephone Company. Capital stock, $50,000. Incorporators, Oliver Dalrymple, John L. Dalrymple, Casselton; William F. Dalrymple, Duluth, Minn.

MICHIGAN CITY—Michigan Telephone Company. Capital stock, $5,000. Incorporators, Edward Litton, Larimore, N. D.; J. H. Lerrett, G. F. Lamb, W. D. Wagner, J. O. Neill, Michigan City, N. D.

DONNYBROOK—The Donnybrook Telephone Company. Capital stock, $50,000. Incorporators, Fred M. White, William A. Sherman, John C. Holbrook, John R. Morrison, Ellwood Galehouse of Donnybrook.

OHIO.

MARIETTA—Lowell Farmers' Telephone Company. Capital stock, $10,000. Incorporators, John Buck and Charles Schimmel.

CLINTON—Clinton Telephone Company. Capital stock, $5,000. Incorporators, J. A. Smith, J. Grant Hyde, Ed. Shoudel, H. F. Serpass, L. M. Fierlin.

CHAGRIN FALLS—Home Telephone Company. Capital stock, $250,000. Incorporators, T. P. Ryan, W. B. Nutt, H. J. Brown, J. T. Daniels, James Niven.

YORKSHIRE—Yorkshire Telephone Company. Capital stock, $10,000. Incorporators, E. A. Fisher, J. C. Deuber, M. J. Brandon, S. D. Apple, J. W. Kecker and John Vankey.

YORKSHIRE—Yorkshire Telephone Company, Darke county. Capital stock, $10,000. Incorporators, E. A. Fisher, J. C. Deuber, M. J. Brandon, S. D. Apple, J. W. Kecker, John Vankey.

LOWELL—Highland Telephone Company has been organized. Officers: J. D. Snyder, president; Daniel Henneman, vice-president; C. F. Shinn, secretary; John Mattern, Sr., treasurer.

OKLAHOMA.

CLEVELAND—The Farmers' Central Telephone Company. Capital stock, $2,500. Incorporators, E. W. Swallow, J. N. Ashbere, J. L. Hohsall, R. M. Bernard, and others.

NARDIN—The High Point Mutual Telephone Company. Capital stock, $1,000. Incorporators, John H. Dickerman, J. W. Quillian, R. W. Swain, Ed Huffman, Steve Schulte, all of Nardin.

OKLAHOMA CITY—Northwestern Rural Telephone Company. Capital stock, $10,000. Directors, George G. Miller, D. A. Schriver, J. C. Young, W. N. Shellenberger and W. M. Chapper, all of Oklahoma City.

CORBET—Citizens' Telephone Company. Capital stock, $10,000. E. M. Abernathy, president; J. P. Corbett, secretary; Dr. Ball of Box, treasurer; J. J. Brown, William Pierson, William Mouteau, Dr. Royster, Lee Belley, and W. E. D. Dragoo, directors. The object of this company will be to erect and maintain telephone lines throughout Cleveland and Pottawatomie counties in the rural districts. Switchboards will be placed at central points and a general rural system inaugurated as the demand asserts itself.

PENNSYLVANIA.

RIMERSBURG—Rimersburg Telephone Company. Capital stock, $5,000.

ENTRIKEN—The Woodcock Valley Telephone Company. Capital stock, $5,600.

GALETON—The Galeton & Hull Telephone Company. Capital stock, $5,000.

SPRINGTOWN—Franklin Telephone and Telegraph Company. Capital stock, $5,000.

CLEARFIELD—The Clearfield & Cambria Telephone Company. Capital stock, $5,000. C. L. McMurray, Allisonville, treasurer.

COUDERSPORT—The Railroad Telegraph & Telephone Company. Capital stock, $10,000. Benjamin Kuykendall, Jr., Towanda, treasurer.

BELLRUN—The Bell Run Telephone Company. Capital stock, $6,000. Incorporators, F. E. Gleason, J. J. Roberts, Ceres; L. M. Lauphen, Bellrun.

EAU CLAIRE—The Eau Claire Telephone Company. Capital stock, $15,000. Directors, T. L. Anderson, Parker's Landing; A. O. Miller and W. T. McDonald, Eau Claire; Harry Hamilton, Hilliard; Leon Grove, Boyer.

MASTERSONVILLE—The charter of the Mastersonville Telephone Company has been received for record in the office of the recorder. Capital stock is $10,000. The directors are as follows: B. S. Stauffer, Jacob S. Hackman, E. H. Zug; treasurer, Jeremiah S. Hackman.

TENNESSEE.

LICK CREEK—Lick Creek Telephone Company. Capital stock, $500. Incorporators, I. N. Hull and others.

VERMONT.

LUDLOW—At a recent meeting of the Ludlow Telephone Company the following officers were elected: President, Frank W. Agan; secretary, Frank A. Walker; treasurer, R. E. Hathorn.